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Economic Performance and Government Size

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Economic Performance and Government Size*

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Abstract

We construct a growth model with an explicit government role, where more government resources reduce the optimal level of private consumption and of output per worker. In the empirical analysis, for a panel of 108 countries from 1970-2008, we use different proxies for government size and institutional quality. Our results, consistent with the presented growth model, show a negative effect of the size of government on growth. Similarly, institutional quality has a positive impact on real growth, and government consumption is consistently detrimental to growth. Moreover, the negative effect of government size on growth is stronger the lower institutional quality, and the positive effect of institutional quality on growth increases with smaller governments. The negative effect on growth of the government size variables is more mitigated for Scandinavian legal origins, and stronger at lower levels of civil liberties and political rights. Finally, for the EU, better overall fiscal and expenditure rules improve growth.

JEL: C10, C23, H11, H30, O40
Keywords: growth, institutions, fiscal rules, pooled mean group, common correlated effects

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Contents

Non-technical summay

Governments tend to absorb a sizeable share of society's resources and, therefore, they affect economic development and growth in many countries. However, despite necessary, government intervention is not a sufficient condition for prosperity, if it leads to the monopolization of the allocation of resources and other important economic decisions, and societies do not succeeded in attaining higher levels of income.

The existing literature presents mixed results as to the relationship between government size and economic development. On the one hand, the former may impact economic growth negatively due to government inefficiencies, crowding-out effects, excess burden of taxation, distortion of the incentives systems and interventions to free markets. On the other hand, government activities may also have positive effects due to beneficial externalities, the development of a legal, administrative and economic infrastructure and interventions to offset market failures.

Our paper includes several contributions: i) we construct a growth model allowing for an explicit government role, we characterize the conditions underlying the optimal path of the economy and determine the steady-state solutions for the main aggregates; ii) we analyse a wide set of 108 countries composed of both developed and emerging and developing countries, using a long time span running from 1970-2008, and employing different proxies for government size and institutional quality to increase robustness; iii) we build new measures of extreme-type political regimes which are then interacted with appropriate government size proxies in non-linear econometric specifications; iv) we make use of recent panel data techniques that allow for the possibility of heterogeneous dynamic adjustment around the long-run equilibrium relationship as well as heterogeneous unobserved parameters and cross-sectional dependence; vi) we also deal with potentially relevant endogeneity issues; and vii) for an EU sub-sample we assess the relevance of numerical fiscal rules in explaining differentiated GDP and growth patterns.

Our results show a significant negative effect of the size of government on growth. Similarly, institutional quality has a significant positive impact on the level of real GDP per capita. Interestingly, government consumption is consistently detrimental to output growth irrespective of the country sample considered (OECD, emerging and developing countries). Moreover, i) the negative effect of government size on GDP per capita is stronger at lower levels of institutional quality, and ii) the positive effect of institutional quality on GDP per capita is stronger at smaller levels of government size.

On the other hand, the negative effect on growth of the government size variables is more attenuated for the case of Scandinavian legal origins, while the negative effect of government size on GDP per capita growth is stronger at lower levels of civil liberties and political rights. Finally, and for the EU countries, we find statistically significant positive coefficients on overall fiscal rule and expenditure rule indices, meaning that having stronger fiscal numerical rules in place improves GDP growth.

1. Introduction

Governments tend to absorb a sizeable share of society's resources and, therefore, they affect economic development and growth in many countries.[1] Throughout history high levels of economic development have been attained with government intervention. Where it did not exist, little wealth was accumulated by productivity economic activity. However, despite necessary, government intervention is not a sufficient condition for prosperity, if it leads to the monopolization of the allocation of resources and other important economic decisions, and societies do not succeeded in attaining higher levels of income.

In addition, economic progress is limited when government is zero percent of the economy (absence of rule of law, property rights, etc.), but also when it is closer to 100 percent (the law of diminishing returns operates in addition to, e.g., increased taxation required to finance the government's growing burden – which has adverse effects on human economic behaviour, namely on consumption decisions). This idea is related to the so-called "Armey Curve", after Richard Armey, who borrowed a graphical technique popularized by Arthur Laffer, whose crucial underpinnings were already present in Dupuit (1844). Friedman (1997) suggested that the threshold where government's role in economic growth is between 15-50% of the national income.

The existing literature also presents mixed results as to the relationship between government size and economic development. On the one hand, the former may impact economic growth negatively due to government inefficiencies, crowding-out effects, excess burden of taxation, distortion of the incentives systems and interventions to free markets (Barro, 1991; Bajo-Rubio, 2000). Indeed, several studies report that the efficiency of government spending can increase, either by delivering the same amount of services with fewer resources or by using more efficiently existing spending levels (see Afonso et al., 2005, 2011). Moreover, Slemrod (1995) and Tanzi and Zee (1997) find a negative impact if the size of government exceeds a certain threshold. The rationale behind this argument is that in countries with big governments the share of public expenditures designed to promote private sector productivity is typically smaller than in countries with small governments (Folster and Henrekson, 2001). On the other hand, government activities may also have positive effects due to beneficial externalities, the development of

[1] According to the Wagner's Law the scope of the government usually increases with the level of income because government has to maintain its administrative and protective functions, its attempts to ensure the proper operation of market forces and provision of social and cultural (public) goods.

a legal, administrative and economic infrastructure and interventions to offset market failures (Ghali, 1998; Dalagamas, 2000).

Our motivation also comes from Guseh (1997) who presents a model that differentiates the effects of government size on economic growth across political systems in developing countries. Growth in government size has negative effects on economic growth, but the negative effects are three times as great in non-democratic systems as in democratic systems.

Our paper includes several novel contributions: i) we construct a growth model allowing for an explicit government role, we characterize the conditions underlying the optimal path of the economy and determine the steady-state solutions for the main aggregates; ii) we analyse a wide set of 108 countries composed of both developed and emerging and developing countries, using a long time span running from 1970-2008, and employing different proxies for government size and institutional quality to increase robustness; iii) we build new measures of extreme-type political regimes which are then interacted with appropriate government size proxies in non-linear econometric specifications; iv) we make use of recent panel data techniques that allow for the possibility of heterogeneous dynamic adjustment around the long-run equilibrium relationship as well as heterogeneous unobserved parameters and cross-sectional dependence (e.g. Pooled Mean Group, Mean Group, Common Correlated Pooled estimators, inter alia); vi) we also deal with potentially relevant endogeneity issues; and vii) for an EU sub-sample we assess the relevance of numerical fiscal rules in explaining differentiated GDP and growth patterns.

Our results show a significant negative effect of the size of government on growth. Similarly, institutional quality has a significant positive impact on the level of real GDP per capita. Interestingly, government consumption is consistently detrimental to output growth irrespective of the country sample considered (OECD, emerging and developing countries). Moreover, i) the negative effect of government size on GDP per capita is stronger at lower levels of institutional quality, and ii) the positive effect of institutional quality on GDP per capita is stronger at smaller levels of government size.

On the other hand, the negative effect on growth of the government size variables is more attenuated for the case of Scandinavian legal origins, while the negative effect of government size on GDP per capita growth is stronger at lower levels of civil liberties and political rights. Finally, and for the EU countries, we find statistically significant positive coefficients on overall fiscal rule and expenditure rule indices, meaning that having stronger fiscal numerical rules in place improves GDP growth.

The remainder of the paper is organised as follows. Section two presents the theoretical model, which underlies and motivates the empirical specifications. Section three addresses data-related issues. Section four elaborates on the econometric methodology and presents and discusses our main results. Section five concludes the paper.

2. Model and Econometric Specification

In this section we present a growth model that relates output and government size and it will provide the theoretical motivation for our empirical (panel) analysis in Section 3. We consider a typical economy with a constant elasticity of substitution utility function of the representative agent given by:

$$U = \int_0^{\infty} e^{-\gamma t} \frac{c_t^{\;1-\theta} - 1}{1-\theta} dt \tag{1}$$

where c is per capita consumption, θ is the intertemporal substitution and γ is the (subjective) time discount rate or rate of time preference (a higher γ implies a smaller desirability of future consumption in terms of utility compared to utility obtained by current consumption. Population (which we assume identical to labour force, L) grows at the constant rate n, that is, $L_{it} = L_{i0} e^{n_i t}$. Output in each country i at time t is determined by the following Cobb-Douglas production function:

$$Y_{it} = K_{it}^{\;\alpha} G_{it}^{\;\beta} (A_{it} L_{it})^{1-\alpha-\beta}, 0 < \alpha < 1,\ 0 < \beta < 1,\ 0 < \alpha + \beta < 1 . \tag{2}$$

Y is the final good, used for private consumption, G is public consumption expenditure, which proxies for government size, and K is the stock of physical capital. We consider the case of no depreciation of physical capital. The output used to produce G equals qG (which one can think of as being equivalent to a crowding-out effect in private sector's resources). A is the level of technology and grows at the exogenous constant rate μ, that is, we have

$$A_{it} = A_{i0} e^{\mu_i t + I_{it} \rho_i} \tag{3}$$

with I_{it} being a vector of institutional quality, political regime, legal origin and other related factors that may affect the level of technology and efficiency in country i at time t, and ρ_i is a vector of (unknown) coefficients related to these variables. In this framework, the state of labour-augmenting technology (A) depends not only on exogenous technological improvements determined by μ, but also on the level of institutional quality (such as the rule of law), the degree of democratic political foundations, etc. Institutions may be critical in facilitating technological breakthroughs, which may not occur without appropriate sound institutional environments. The presence of efficient and effective institutions ensures that labour can be used for productive purposes, instead of being wasted with red tape or rent seeking activities (North, 1990; Nelson and Sampat, 2001).

We begin by writing down the resource constraint for this economy in per worker terms, given by:

$$\dot{K}_t = Y_t - C_t - qG_t \Leftrightarrow \dot{k}_t = y_t - c_t - qg_t - nk_i \tag{4}$$

where $\dot{K}_t$ is the time derivative of physical capital and small letters represent per worker terms (after scaling down by L).

We now write the conditions that characterize the optimal path for the economy and determine the steady-state solution for private and public consumption and income per worker. The optimal path is the solution of:

$$\begin{aligned} &\max_{c_t, g_t} \int_0^\infty e^{-\gamma t} \frac{c_t^{1-\theta} - 1}{1-\theta} dt \\ &s.t.: \dot{k}_t = k_t^{\alpha} g_t^{\beta} A_t^{1-\alpha-\beta} - c_t - qg_t - nk_i \end{aligned} \quad . \tag{5}$$

Solving the Hamiltonian's corresponding first order conditions and after some manipulations yields (in per capita terms):[2]

$$\begin{aligned} k^* &= A\left(\frac{\alpha}{\theta\mu + \gamma + n}\right)^{\frac{1-\beta}{1-\alpha-\beta}} \left(\frac{\beta}{q}\right)^{\frac{1-\beta}{1-\alpha-\beta}} \\ g^* &= A^{\frac{1-\alpha-\beta}{1-\beta}} \left(\frac{\beta}{q}\right)^{\frac{1-\beta}{1-\alpha-\beta}} k^{*\frac{\alpha}{1-\beta}} \\ y^* &= k^{*\alpha} g^{*\beta} A^{1-\alpha-\beta} \\ c^* &= y^* - (n+\mu)k^* - qg^* \end{aligned} \tag{6}$$

A special case occurs when $\alpha + \beta = 1$ and $n = \mu = 0$ in which there is no transition dynamics and the economy is always in the balanced growth path.

We refrain from making full considerations on the model's solution, but one, in particular, is worth making:[3] an increase in q (which implicitly proxies the overall size of the public sector translating the fact that more resources are needed/required to finance G) reduces both the optimal level of private consumption per worker (and physical capital per

[2] See the Appendix B for full derivation.

[3] In an alternative setting in which the government introduces a tax over total income (or production) to finance public consumption, the overall conclusion (with respect to the effect of government size) does not change.

worker) and, more importantly, the optimal level of output per worker in this model economy.

Turning to econometric specification, in the steady state, output per effective worker ($\hat{y}_{it} = Y_{it} / A_{it} L_{it}$) is constant while output per worker ($y_{it} = Y_{it} / L_{it}$) grows at the exogenous rate μ. In general, output in effective worker terms evolves as $\hat{y}_{it} = (k_{it})^{\alpha} (g_{it})^{\beta}$ and in (raw) worker terms, output evolves according to $y_{it} = A_{it} (k_{it})^{\alpha} (g_{it})^{\beta}$. Taking logs on both sides we get $\ln y_{it} = \ln A_{it} + \alpha \ln k_{it} + \beta \ln g_{it}$, and using (3) and the fact that in (2) we have $(A_{it} L_{it})^{1-\alpha-\beta}$ entering the utility function, we obtain,

$$\ln y_{it} = A_0 + (1-\alpha-\beta)\mu_i t + (1-\alpha-\beta)\rho_i I_{it} + \alpha \ln k_{it} + \beta \ln g_{it} . \qquad (7)$$

Equation (7) describes the evolution of output per worker (or labour productivity), as a function of a vector of institutional and political related variables, which may change over time, the size of the public sector or government, the level of physical capital and the exogenous growth rate of output. Given the production function relationship, (7) is valid both within and outside the steady-state and this is important, particularly, if one makes use of static panel data techniques for estimation purposes. Moreover, it is not dependent on assumptions on the behaviour of savings, hence offering a reasonable basis for estimation. Based on (7), we will use both a linear and non-linear specification (in which interaction or multiplicative terms are included), as follows:

$$\ln y_{it} = b_0 + b_1 t + b_3 I_{it} + b_4 \ln k_{it} + b_5 \ln g_{it} + \varepsilon_{it} \qquad (8)$$

$$\ln y_{it} = b_{0i} + b_1 t + b_3 I_{it} + b_4 \ln k_{it} + b_5 \ln g_{it} + b_6 (I_{it} g_{it}) + \eta_{it} \qquad (9)$$

where the *b*'s are (unknown) parameters to be estimated, I_{it} and g_{it} denote the proxies for institutional quality and government size, respectively, and ε_{it} and η_{it} are model specific error terms satisfying the usual assumptions of zero mean and constant variance. Equations (8) and (9) provide the basis for the empirical models to be estimated in Section 3.

3. Data

The dataset consists of a panel of observations for 108 countries for the period 1970-2008. The sample countries are grouped into developed (OECD) and emerging and developing based on the World Bank classification. Annual data on real GDP per capita (*y*) and gross fixed capital formation (*inv*) are retrieved from the World Bank' World Development Indicators. We estimate the capital stock (*Ky*) using the perpetual inventory method, that is, $Ky_t = I_t + (1-\delta)Ky_{t-1}$, where I_t is the investment and δ is the depreciation rate. Data on I_t comes from Summers and Heston's PWT 6.3 as real aggregate investment in PPP. We estimate the initial value of the capital stock (Ky_0), in year 1950 as $I_{1950}/(g+\delta)$ where g is the average compound growth rate between 1950 and 1960, and δ is the depreciation rate (set to 7% for all countries and years).

Our proxies of government size (g) will be the respective Gwartney and Lawson's (2008) composite variable (*govsize*). This variable includes government consumption expenditures (as a percentage of total consumption), transfers and subsidies (as a percentage of GDP), the underlying tax system (proxied by top marginal tax rates) and the number of government enterprises. We also make use of total government expenditures (*totgovexp_gdp*), government consumption (*govcons_gdp*) – as in our theoretical model - and, finally, total government debt (*govdebt_gdp*). The first two variables come from a merger between WDI, the IMF's International Financial Statistics (IFS) and Easterly's (2001) datasets.[4] The latter was retrieved from the recent IMF's historical debt series due to Abas et al. (2010).

For institutional-related variables (our *I*) we rely on: i) the Polity 2 (*polity*) measure and regime durability in years (*durable)* (from Marshall and Jaegger's Polity's 4 database), ii) Freedom House's Political Rights (*pr*), Civil Liberties (*cl*) and composite index (*fh*)[5], iii) the corruption perception index (*cpi*) (from the Transparency International database), iv) an index of democratization (*demo*) due to Vanhanen (2005), v) a governance index (*governance*)[6] from Kaufman et al. (2009) (World Bank project), vi) the political system (*ps*), a dummy variable that takes a value zero for presidential regime, the value one for the assembly-elected presidential regime and two for parliamentary regime (from the Database of Political Institutions), and vii) countries' legal origins, English (*bri*), French (*fre*), German (*ger*) or Scandinavian (*sca*)[7] (from La Porta et al., 1999).[8]

For robustness purposes we will also make use of factor analysis and combine different sets of institutional-related variables (in particular, *pr, cl, polity, demo* and *cpi*) and then look at the first common factor. However, the sampling technique is unfortunately

[4] The classification of the data is described in IMF (2001).
[5] Constructed by simply averaging Political Rights and Civil Liberties.
[6] This is the result of averaging six variables: voice and accoutability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption.
[7] There is no risk of multicollinearity since "socialist" legal origin is not included explicitly on the right-hand-side as an explanatory variable.
[8] Data sources and definitions are provided in the Appendix.

restricted to the fact that cross-country data are limited in the country coverage and vary widely across different data sources. This limitation creates an incomplete data issue and poses a problem for the Principal Component Analysis (PCA) that we wish to employ. Indeed, PCA is based on an initial reduction of the data to the sample mean vector and sample covariance matrix of the variables, and this cannot be estimated from datasets with a large proportion of missing values (Little and Rubin, 1987).[9] Hence, imputation is required prior to extracting the first principal component.[10] The Expectation-Maximization Algorithm (EMA) as suggested by Dempster et al. (1977) is used to fill in missing data. This algorithm is based on iterating the process of regression imputation and maximum likelihood and it consists of two steps: the first step, the "E (expectation)-step" computes expected values (conditional on the observed data) and the current estimates of the parameters. Using the estimated "complete data", in the second step or "M-step", the EMA re-estimates the means, variances and covariances using a formula that compensates for the lack of residual variation in the imputed values.[11]

The first principal component is normalized in such a way that high values indicate higher institutional quality. Our standardized index, *EMA_PCA*, can be written as:[12]

$$EMA\_CA = 0.78cl + 0.89\,pr + 0.92\,polity + 0.69demo + 0.34cpi$$

In addition, the first principal component explains 73.6% of the total variance in the standardized data.[13] This aggregate index will be used in some of the regressions discussed in Section 3.3.

For illustration purposes, Figures 1.a-b and 2.a-b present evidence for a sample of 108 countries supporting the unclear relationship between real GDP (in levels and growth rates)

[9] Moreover, the lack of data also increases the degree of uncertainty and influences the ability of draw accurate conclusions.

[10] The varimax rotation method, which is an ortogonal rotation of the factor axes to maximize the variance of the squared loadings of a factor on all variables in a factor matrix, is chosen.

[11] The EMA assumes that the data are missing at random (MAR) and in order to check that the MAR assumption can be applied to the measures of institutional quality, a test analysis called "separate variance t-test", in which rows are all variables which have 1% missing or more, and columns are all variables, is carried out. The p-values are more than 5% meaning that missing cases in teh row variable are not significantly correlated with the column variable and this, can be considered as MAR.

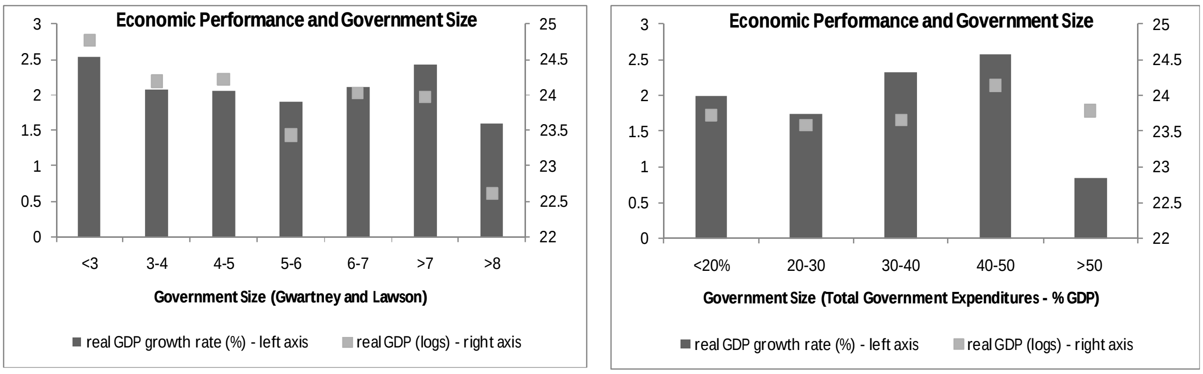
[12] A likelihood ratio test was used to examine the "sphericity"case, allowing for sampling variability in the correlations. This test comfortably rejects sphericity at the 1% level with a Kaiser-Meyer-Olkin measure of sampling adequacy equal to 0.831.

[13]Given that the PCA is based on the classical covariance matrix, which is sensitive to outliers, we take one further step by basing it on a robust estimation of the covariance (correlation) matrix. A well suited method is the Minimum Covariance Determinant (MCD) that considers all subsets containing h% of the observations and estimates the variance the mean on the data of the subset associated with the smallest covariance matrix determinant - we implement Rousseeuw and Van Driessen's (1999) algorithm. After re-computing the same measure with the MCD version we obtain similar results, meaning that outliers are not driving our factor analysis (the correlation coefficient between the two equals 98,04%, statistically significant at 1% level).

and two different proxies of government size (the Gwartney and Lawson's (2008) composite variable and total government expenditures as share of GDP – see Section 3.1 for details). Hence, there is a need to shed light on this relationship with appropriate empirical methods.

Figure 1: Bar-Charts: Economic Performance and Government Size

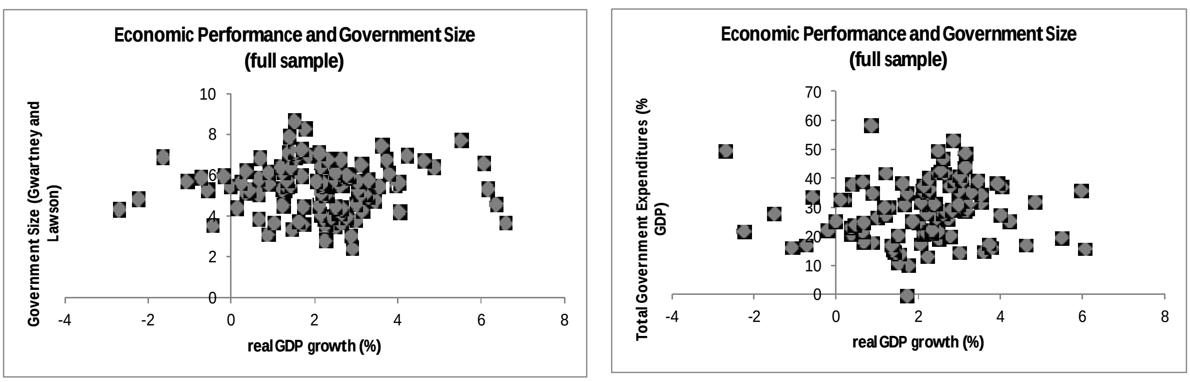
(a) (b)



Source: Authors' calculations

Figure 2: Scatter-Plots: Economic Performance and Government Size

(a) (b)



Source: Authors' calculations

The variation of causality between government size and growth detected in cross-section and time-series papers suggests that there are important differences in the way in which governments influence economic performance across countries. We argue that it may reflect, lato sensu, institutional differences across countries and, while this is a plausible conjecture, there is as yet little direct evidence to confirm that institutions and political regimes make a difference to the way in which governments affect economic outcomes.

4. Methodology and Results

4.1 Baseline Results

Equations (8) and (9) can be estimated directly using panel data techniques which allow for both cross-section and time-series variation in all variables and present a number of advantages vis-à-vis standard Barro-type pooled cross-section estimation approaches (see Greene, 2003).

Table 1.a and 1.b present our first set of results for the pooled OLS and fixed-effects specifications, respectively (the former is presented for completeness). Both tables are divided into two panels (A and B) covering different proxies for institutional quality (eight in total). At this point, we use Gwartney and Lawson's government size measure only and discuss its individual inclusion in our regression of interest as well as its interaction with a variable I_{it}.

[Tables 1.a, 1.b]

A few remarks are worth mentioning. There is a positive effect of the capital stock on the level of real GDP per capita throughout the different specifications regardless of the institutional variable employed. One also finds a consistent and statistically significant negative coefficient on the government size (less so when fixed-effects are used – Table 1.b). Similarly, institutional quality has a consistent and statistically significant positive impact on the level of real GDP per capita (more mitigated with fixed-effects). Finally, when statistically significant the interaction term is negative, meaning that i) the negative effect of government size on GDP per capita is stronger at lower levels of institutional quality, and ii) the positive effect of institutional quality on GDP per capita is stronger at smaller levels of government size. The interaction term means that the marginal effect of government size will differ at different levels of institutional quality. However, this result depends on the proxy used for I_{it}. Nevertheless, we obtain in most regressions considerably high R-squares. Moreover, when regional dummies are included, coefficients keep their statistical significance and sign.

If we redo the exercise with the EMA_PCA variable instead, for both pooled OLS and fixed-effects estimators, Table 2 shows meaningful results for the size of the government and for the institutional quality index, when OLS is considered.

[Table 2]

4.2 Endogeneity Issues and Dynamic Panel Estimation

In the analysis of empirical production functions, the issue of variable endogeneity is generally of concern. Moreover, instead of estimating static equations, we now allow for dynamics to play a role. Hence, we reformulate our regression equation(s) and take real GDP growth per capita as our dependent variable being a function of lagged real GDP per capita, investment (gross fixed capital formation as percentage of GDP), a government-size proxy and an interaction term (with an institutional quality proxy) – as common practice in the empirical growth literature. We estimate this new specification by means of the Arellano-Bover system-GMM estimator[14] which jointly estimates the equations in first differences, using as instruments lagged levels of the dependent and independent variables, and in levels, using as instruments the first differences of the regressors.[15] Intuitively, the system-GMM estimator does not rely exclusively on the first-differenced equations, but exploits also information contained in the original equations in levels.

Another novelty of this paper is the construction of new (and more meaningful) democracy measures based on the variable *polity* (presented in Section 3 and described in the Appendix A). The role of political systems and democracy in particular, on the government size-growth relationship is assessed by regressing three structural aspects of democracy (to be defined below) on 5-year averages of real GDP per capita growth rates.[16] Indeed, *polity* does not capture two important dimensions of political regimes - either their newness (following, for example, democratization or a return to authoritarian rule) or their more established (consolidated) nature.

Therefore, Rodrik and Wacziarg (2005) define a major political regime change to have occurred when there is a shift of at least three points in a country's score on *polity* over three years or less. Using this criterion we define new democracies (ND=1) in the initial year (and subsequent four years) in which a country's *polity* score is positive and increases

[14] The GMM approach estimates parameters directly from moment conditions imposed by the model. To enable identification the number of moment conditions should be at least as large as the number of unknown parameters. Moreover, the mechanics of the GMM approach relates to a standard instrumental variable estimator and also to issues such as instrumental validity and informativeness.

[15] As far as information on the choice of lagged levels (differences) used as instruments in the differences (levels) equation, as work by Bowsher (2002) and, more recently Roddman (2009) has indicated, when it comes to moment conditions (as thus to instruments) more is not always better. The GMM estimators are likely to suffer from "overfitting bias" once the number of instruments approaches (or exceeds) the number of groups/countries (as a simple rule of thumb). In the present case, the choice of lags was directed by checking the validity of different sets of instruments and we rely on comparisons of first stage R-squares.

[16] An equation with real GDP per capita growth as the dependent variable is motivated by (standard) augmentation of Solow-Swan type models with a government size proxy (similarly to our production function in Section 2) and following Barro and Sala-i-Martin's (1992) and Mankiw et al.'s (1992) approaches.

by at least three points and is sustained, ND=0 otherwise. Established democracies (ED=1) are those new democratic regimes that have been sustained following the 5 years of a new democracy (ND). In any subsequent year, if established democracies (ED) fail to sustain the status of ND, ED=0. Using these criteria, they define sustained democratic transitions (SDT) as the sum of ND and ED. They use the same procedure, mutatis mutandis, to define new autocracies (NA), established autocracies (ES) and sustained autocratic transition (SAT).

This yields six distinct binary-type measures of the character of political regimes - ND, ED, NA, EA, SDT, and SAT - for most years during 1970-2008. Finally, Rodrik and Wacziarg (2005) define small regime changes (SM) as changes in *polity* from one year to the next that are less than three points.[17] A recent empirical application of these measures to explain the impact of extreme-type political regimes on economic performance can be found in Jalles (2010). There are several advantages from creating these new measures, which allow us to distinguish the impact of new and established electoral democracies and autocracies on economic development, and also to assess the impact of sustained democratic and autocratic transitions on economic growth.

Endogeneity[18] between right-hand side measures of democracy and autocracy and a standard set of control variables is corrected for by taking a system-GMM (SYS-GMM) approach – as detailed above. As suggested in Mauro (1995), La Porta et al. (1997), Hall and Jones (1999), Acemoglu et al. (2001) and Dollar and Kraay (2003), the democracy measures are instrumented by:

1. the durability (age in years) of the political regime type (*durable*) retrieved from Marshall and Jaeggers' database.[19]
2. *latitude* (from La Porta et al., 1999): Hall and Jones (1999) launched the general idea that societies are more likely to pursue growth-promoting policies, the more strongly they have been exposed to Western European influence, for historical or geographical reasons. In this context, other two possible instruments could be common and civil law, translating the type of legal origin of each different country (see La Porta et al., 1998).

[17] Thus SM = 1 for a small regime change and SM = 0 otherwise.
[18] And also the existence of possible measurement errors when accounting for democracy.
[19] The average age of the party system is also used in Przeworski et al. (2000) and Beck et al. (2001). This potential instrument is also in line with Bockstette, Chanda and Putterman (2002) who document the use of the state antiquity index as an appropriate instrument for institutional quality.

3. ethnic fragmentation (*ethnic*) (from Alesina et al., 2003): on a broad level, the role of ethnic fragmentation in explaining the (possible) growth effect of democracy can be derived from the literature on the economic consequences of ethnic conflict. It has been shown that the level of trust is low in an ethnically divided society (Alesina and La Ferrara, 2000). Moreover, the lack of co-operative behaviour between diverse ethnic groups, leads to the tragedy of the commons as each group fights to divert common resources to non-productive activities (e.g. Mauro, 1995).[20]

Table 3 reports the results with the four proxies for government size defined in Section 3 and splitting the sample into OECD, emerging and developing countries groups. Focusing on the full sample first we observe that the Gwartney and Lawson's government size measure appears with a statistically significant negative coefficient. When interacted with SAT it has a negative and statistically significant coefficient, meaning that in autocratic countries increased government size has greater negative effect on output growth. The reverse is true for democratic countries, whose negative impact of government size is mitigated but remains mostly negative. The remaining proxies keep the statistically negative coefficient, but interaction terms lose economic and statistical relevance. For the OECD sub-group the individual effects of the different proxies of government size are similar but interaction terms are never statistically significant. Developing countries report a statistically negative coefficient on government consumption expenditure and debt-to-GDP ratio, with the latter having a lesser detrimental effect in democratic countries. All in all, government consumption is the proxy that is more consistently and clearly detrimental to output growth.

[Table 3]

More stringent empirical tests on the role of democracy on the government size-growth relation were carried out, for robustness purposes (similarly to Rock, 2009). We defined "extreme" democratic transitions as those where the *polity* variable is greater than 5. In these instances, a new sustainable democratic transitions variable, SDT1 = 1 when *polity* > 5, otherwise SDT1 = 0. Similarly, a new sustainable autocratic transitions variable was created, SAT1 = 1 when *polity* < -5, otherwise SAT1 = 0. The logic behind this

[20] Other similarly possible instruments are the historical settler mortality or population density in 1500, as in Acemoglu and Robinson (2005), the constitutional initiative which allows citizens to amend or demand a revision of the current constitution (as in Poterba, 1996), the share of population that speaks any major European language - *Eurfrac* -, inter alia. For the three instruments chosen the exclusion restriction is that durability, latitude and ethnic fragmentation do not have any impact on present economic growth other than their impact on democracy.

construction is to test for the impact of democracy and autocracy on growth in cases where countries' governments are closer to either pure democracies or pure autocracies.[21] Results (not shown) using the new SAT1 and SDT1 variables do not qualitatively change the results presented in Table 3 and discussed above.

We also assessed the importance of political-institutional measures, specifically legal origins. From Table 4 a first general conclusion is that interaction terms with a Scandinavian legal origin dummy yields the higher (in absolute value) estimated coefficients (when significant), compared with other legal origins. More particularly, in specification 4 and 5, for the full sample and OECD respectively, the government debt-to-GDP ratio and government size appear with a (statistically) negative coefficient; however, this effect on growth is mitigated particularly if a country has a Scandinavian legal origin. For developing countries, both French and British legal origins appear with statistically significant positive interaction term coefficients when the government size proxy is total government expenditures.

[Table 4]

As suggested by Ram (1986) another possible specification is the use of the growth rate of the government size proxy. We also test this specification to determine its impact on growth across political systems or levels of institutional quality. All variables are retained except G_{it} that is now replaced by dG_{it} / G_{it} together with the corresponding interaction term. The results are presented in Table A1 in the Annex. Comparing with our previous results the coefficients of the linear term of government size proxies (apart from the debt-to-GDP ratio) are positive and statistically significant in two specifications (2 and 5). According to Conte and Darrat (1988) Ram's specification is suitable for testing short-term growth effects, while the specification used in this paper assesses the effects of government size on the underlying growth rate. Growth and development are long-run concepts whereas management of aggregate demand, a Keynesian prescription, is basically a short-term concept. Hence, while short-term measures of government may have a positive impact on an economy, the impact of government on the underlying growth rate generally differs between political regimes and legal origins as found in this paper (a comparable robustness analysis is reported in Annex Table A2).

[21] The cut-off point for defining these measures of democracy/autocracy was taken directly from Marshall and Jaeggers (http://www.systemicpeace.org/polity/polity4.htm).

Further in our inspection similar regressions, where the I_{it} variable is now replaced with the composite Freedom House index, were estimated.[22] Two main results are worth mentioning: i) government size keeps its statistically significant negative sign, but its interaction with the Freedom House index yields a statistically negative coefficient (for the full sample), suggesting that the negative effect of government size on GDP per capita growth is stronger at lower levels of civil liberties and political rights; and ii) for the OECD sub-group debt has a statistically significant negative coefficient estimate and its interaction with the Freedom House index results in a negative estimate significant at 5 percent level.

4.3 Fiscal Rules

In the context of the EU, Member States face a fiscal framework that asks for the implementation of sound fiscal policies, notably within the Stability and Growth Pact (SGP) guidelines put forward in 1997. In fact, institutional restrictions to budgetary decision-making are a common feature of fiscal governance in advanced countries (see Hallerberg et al., 2007 for an overview). In addition to excess spending in the absence of such rules, previous literature also suggests that the so-called "common pool problem" may induce a pro-cyclical bias in fiscal policy (Tornell and Lane, 1999). Yet another rational for the implementation of such fiscal rules is to prevent policymakers from exacerbating macroeconomic volatility which is known to be detrimental to output growth. However, the Member States' track records of effectively implementing fiscal rules have been mixed.[23] Therefore, it is relevant to assess whether such fiscal rules, while aiming at improving fiscal positions, also play a role in fostering growth, particularly when interacted with different levels of government size. To our best knowledge such an empirical exercise has never been conducted.

Therefore, we use three indices constructed by the European Commission (overall rule index, expenditure rule index, and budget balance and debt rule index).[24] Tables 5a and 5b report our findings between 1990-2008 using fixed-effects and system-GMM approaches,

[22] See Annex Table A3.

[23] A study by the European Commission (2006) points to significant heterogeneity of national fiscal frameworks within the EU and suggests that "stronger" fiscal rules are conducive to sound public finances (and ultimately more efficient and growth-enhancing economic policies).

[24] These indices are normalized to have a zero mean and unit variance. They are based on a survey conducted by the Working Group on the Quality of Public Finances among practitioners and researchers in the field of fiscal policy. These measures bear strong appeal for empirical implementations as they translate a broad set of institutional provisions into a country-specific cardinal ranking (see Deburn at al., 2008, and Afonso and Hauptmeier, 2009 for details).

respectively. The former incorporates each index individually whereas the latter includes interacted terms between fiscal rules and government size proxies.

[Tables 5a, 5b]

Particularly under the total government expenditure and government spending specifications (4,5, 7, 8) we find statistically significant positive coefficients on the overall rule index and the expenditure rule index, meaning that having these fiscal numerical rules improves GDP growth for these set of EU countries. However, the government size proxy is never significant when these rules are included as additional regressors. When these rules are interacted with a relevant government size proxy, Table 5b, no coefficient is statistically significant.

Finally, we also tested specifications with and without interaction terms, and with a simple splitting rule based on the country-average debt-to-GDP ratio over the entire time period being higher or lower than 60% (in line with the SGP threshold level). Such alternative does not change the statistical (in-)significance of our variables of interest (results not shown).

4.4 Robustness Checks

One concern when working with time-series data is the possibility of spurious correlation between the variables of interest (Granger and Newbold, 1974). This situation arises when series are not stationary, that is, they contain stochastic trends as it is largely the case with GDP and investment series. The advantage of panel data integration is threefold: firstly, enables to by-pass the difficulty related to short spanned time series; secondly, the tests are more powerful than the conventional ones: thirdly, cross-section information reduces the probability of a spurious regression (Barnerjee, 1999).[25] Results of first (Im-Pesaran-Shin, 1997; Maddala-Wu, 1999) and second generation (Pesaran CIPS, 2007) panel integration tests are presented in the Annex (Tables A4 and A5).[26] We can accept most conservatively that nonstationarity cannot be ruled out in our dataset.

In face of this finding, it seems that the time-series properties of the data play an important role: we suggest that the bias in our models is the result of nonstationary errors, which are introduced into the fixed-effects and GMM equations by the imposition of parameter homogeneity. Hence, careful modelling of short-run dynamics requires a slightly different econometric approach. We assume that (8), or (9), represents the equilibrium

[25] Recall, additionally, that t-ratios are invalid for the estimations if error terms are nonstationary.
[26] For further details on these tests, the interested reader should refer to the original sources.

which holds in the long-run, but that the dependent variable may deviate from its path in the short-run (due, e.g., to shocks that may be persistent). There are often good reasons to expect the long-run equilibrium relationships between variables to be similar across groups of countries, due e.g. to budget constraints or common technologies (unobserved TFP) influencing them in a similar way. In fact, in line with discussions in the empirical growth literature for modelling the "measure of our ignorance" we shall assume that the long-run relationship is composed of a country-specific level and a set of common factors with country-specific factor loadings.

The parameters of (8) and (9) can be obtained via recent panel data methods. Indeed, at the other extreme of panel procedures, based on the mean of the estimates (but not taking into account that certain parameters may be the same across groups), we have the Mean Group (MG)[27] estimator (Pesaran and Smith, 1995) and as an intermediate approach the Pooled Mean Group (PMG)[28] estimator, which involves both pooling and averaging (Pesaran et al., 1999). These estimators are appropriate for the analysis of dynamic panels with both large time and cross-section dimensions, and they have the advantage of accommodating both the long-run equilibrium and the possibly heterogeneous dynamic adjustment process.

Therefore, a second step in our empirical approach is to make use of the Common Correlated Effects Pooled (CCEP) estimator that accounts for the presence of unobserved common factors by including cross-section averages of the dependent and independent variables in the regression equation and where averages are interacted with country-dummies to allow for country-specific parameters. In the heterogeneous version, the Common Correlated Effects Mean Group (CCEMG), the presence of unobserved common factors is achieved by construction and the estimates are obtained as averages of the individual estimates (Pesaran, 2006). A related and recently developed approach due to Eberhardt and Teal (2010) was termed Augmented Mean Group (AMG) estimator and it accounts for cross-sectional dependence by inclusion of a "common dynamic process".[29]

We base our panel analysis on the unrestricted error correction ARDL(p,q) representation:

[27] The MG approach consists of estimating separate regressions for each country and computing averages of the country-specific coefficients (Evans, 1997; Lee et al., 1997). This allows for heterogeneity of all the parameters.
[28] This estimator allows the intercepts, short-run coefficients and error variances to differ freely across groups, but the long-run coefficients are constrained to be the same. The group-specific short-run coefficients and the common long-run coefficients are computed by the pooled maximum likelihood estimation.
[29] We thank Markus Eberhardt for making his code available.

$$\Delta y_{it} = \phi_i y_{it-1} + \beta'_i \, x_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{it-j} + \sum_{q=1}^{q-1} \gamma'_{ij} \, \Delta x_{it-j} + \mu_i + u_{it}, i = 1,2,...,N; t = 1,2,...,T$$

(10)

where y_{it} is a scalar dependent variable, x_{it} is the $k \times 1$ vector of regressors for group *i*, μ_i represents the fixed effects, ϕ_i is a scalar coefficient on the lagged dependent variable. β'_i's is the $k \times 1$vector of coefficients on explanatory variables, λ_{ij}'s are scalar coefficients on lagged first-differences of dependent variables, and γ_{ij}'s are $k \times 1$ coefficient vectors on first-differences of explanatory variables and their lagged values. We assume that the disturbances u_{it}'s in the ARDL model are independently distributed across *i* and *t*, with zero means and constant variances. Assuming that $\phi_i < 0$ for all *i*, there exists a long-run relationship between y_{it} and x_{it} defined as:

$$y_{it} = \theta'_i \, y_{it-1} + \eta_{it}, i = 1,2,...,N; t = 1,2,...,T$$

(11)

where $\theta'_i = -\beta_i' / \phi_i$ is the $k \times 1$ vector of the long-run coefficients, and η_{it}'s are stationary with possible non-zero means (including fixed effects). Equation (10) can be rewritten as:

$$\Delta y_{it} = \phi_i \eta_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{it-j} + \sum_{q=1}^{q-1} \gamma'_{ij} \, \Delta x_{it-j} + \mu_i + u_{it}, i = 1,2,...,N; t = 1,2,...,T$$

(12)

where η_{it-1} is the error correction term given by (11), hence ϕ_i is the error correction coefficient measuring the speed of adjustment towards the long-run equilibrium.

Table 6.a presents our first set of robustness results, and it includes for each sub-sample both the PMG and MG estimates using different proxies for institutional quality entering in linear form together with the Gwartney and Lawson government size variable. For the OECD sub-group we get a positive and statistically significant coefficient on democracy in specification 4 and three statistically negative coefficients of government size when using the MG estimator. For both emerging and developing countries (Panels B and C) statistical significance of government size is hard to find, but the institutional proxy is statistically significant for emerging countries (*pr*, political rights, and democracy), and for developing countries (*cl*, civil liberties).

[Table 6.a]

The MG estimator provides consistent estimates of the mean of the long-run coefficients, though these will be inefficient if slope homogeneity holds. Under long-run slope homogeneity, the pooled estimators are consistent and efficient. The hypothesis of homogeneity is tested empirically in all specifications using a Hausman-type test applied to the difference between MG and PMG. Under the null hypothesis the difference in the estimated coefficients between the MG and the PMG estimators is not significant and the PMG is more efficient. The p-value of such a test is also present in Table 6.a, and only for the OECD the null is rejected, being the MG estimator more efficient, and the long-run slope homogeneity rejected.

In Table 6.b an equivalent set of results is presented but now with the integration term between government size and an institutional proxy of interest. In the case of the OECD the interaction term is negative and statistically significant for the polity indicator instance. However, the government size is not significant. In the case of developing countries, with the polity variable, government size negatively affects the level of per capita GDP, institutional quality appears with positive and statistically significant estimate and, we get a negative interaction coefficient. All in all, results using either PMG or MG estimators do not present extremely consistent evidence on the interactive effect of our variables of interest on the output level.

[Table 6.b]

In Table 7 we allow for both heterogeneous technology parameters and factor loadings as explained above, by running the CCEP, CCEMG and AMG estimators with and without interaction terms (where the institutional proxy variable is now given by the EMA_PCA variable as explained in Section 3). When running the AMG estimator for the OECD group we find some evidence of a statistically significant negative coefficient on the government size variable; while for the developing countries group we uncover only one statistically significant positive coefficient on the EMA-PCA variable, across methods.

[Table 7]

We redo the exercise but similarly to Tables 3 and 4 allow for other proxies of government size to play a role (see Table 8). Only estimated coefficients of the government size proxy, the institutional quality PCA-based measure and the interaction term are reported for reasons of parsimony (full results are available upon request). We present different econometric specifications mainly for robustness and completeness. All in all, we get negative and statistically significant coefficients on total government expenditure, government consumption and public debt-to-GDP ratio irrespectively of the sample under scrutiny. We refrain from making a detailed analysis. Still, for instance, specifications 7 and 11 for the emerging and developing countries groups and with the government consumption as a proxy for government size show a negative effect of government consumption, and a positive effect of the PCA-based institutional measure. Finally, there is a negative interaction term: i) the negative effect of government consumption on GDP per capita is stronger at lower levels of institutional quality, and ii) the positive effect of institutional quality on GDP per capita increases at smaller levels of government consumption.

[Table 8]

5. Conclusion

We constructed a growth model with an explicit government role showing that more resources required to finance government spending reduce both the optimal level of private consumption and of output per worker. Following up on that theoretical motivation we perform an empirical panel analysis with 108 countries from 1970-2008, employing different proxies for government size and institutional quality.

This paper adds to the literature in providing evidence on the issue of whether “too much” government is good or bad for economic progress and macroeconomic performance, particularly when associated with differentiated levels of (underlying) institutional quality and alternative political regimes.

Moreover, we make use of recent panel data techniques that allow for the possibility of heterogeneous dynamic adjustment around the long-run equilibrium relationship as well as heterogeneous unobserved parameters and cross-sectional dependence (e.g. Pooled Mean Group, Mean Group, Common Correlated Pooled estimators, inter alia); vi) we also deal with potentially relevant endogeneity issues.

Our results allow us to draw several conclusions regarding the effects on economic growth of the size of the government: i) there is a significant negative effect of the size of government on growth; ii) institutional quality has a significant positive impact on the level of real GDP per capita; iii) government consumption is consistently detrimental to output growth irrespective of the country sample considered (OECD, emerging and developing countries); iv) moreover, the negative effect of government size on GDP per capita is stronger at lower levels of institutional quality, and the positive effect of institutional quality on GDP per capita is stronger at smaller levels of government size. Therefore, our empirical results are consistent with the growth model presented in the paper.

In addition, the negative effect on growth stemming from the government size variables is more attenuated for the case of Scandinavian legal origins, while the negative effect of government size on GDP per capita growth is stronger at lower levels of civil liberties and political rights.

Finally, and for the EU countries, we find statistically significant positive coefficients on overall fiscal rule and expenditure rule indices, meaning that having better fiscal rules in place improves GDP growth.

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Appendix A – Variables and sources

Variable	Definition/Description	Acronym	Source
real GDP per capita		*Gdppc*	World Bank's Word Development Indicators (WDI)
gross fixed capital formation (% GDP)		*Gfcf_gdp*	WDI
public investment (% GDP)		*Pubinv_gdp*	WDI and AMECO for advanced countries
real aggregate investment in PPP		*I*	Summers and Heston's PWT 6.3
Government size	Composite variable (*govsize*). This variable includes government consumption expenditures (as percentage of total consumption), transfers and subsidies (as percentage of GDP), the underlying tax system (proxied by top marginal tax rates) and the number of government enterprises.	*govsize*	Gwartney and Lawson (2008)
Central Government Debt (% GDP)		*Govdebt_gdp*	IMF (Abas et al., 2010)
Government budget surplus or deficit (% of GDP)	The government budget surplus or deficit as a percentage of GDP.	*Govbal_gdp*	WDI, IMF IFS, Easterly (2001)
Total Government Expenditure (% GDP)		*Totgovexp_gdp*	WDI, IMF IFS, Easterly (2001)
Public Final Consumption Expenditure (% GDP)		*Govcons_gdp*	WDI, IMF IFS, Easterly (2001)
Polity 2	The polity score is computed by subtracting the autoc score (autocracy index) from the democ score (democracy index); the resulting unified polity scale ranges from +10 (strongly democratic) to -10 (strongly autocratic). Refer to the database's supporting documentation for more details.	*polity*	Marshall and Jaegger's Polity's 4 database
Political Rights	Political rights enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate.	*pr*	Freedom House
Civil Liberties	Civil liberties include freedom of speech, expression and the press; freedom of religion; freedom of assembly and association; and the right to due judicial process.	*cl*	Freedom House
corruption perception index	The CPI focuses on corruption in the public sector and defines corruption as the abuse of public office for private gain. The CPI Score relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public.	*cpi*	Transparency International database
index of democratization	This index combines two basic dimensions of democracy – competition and participation – measured as the percentage of votes not cast for the largest party (Competition) times the percentage of the population who actually voted in the election (Participation).	*demo*	Vanhanen (2005)
governance index	This is the result of averaging 6 variables: voice and accoutability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption.	*governance*	Kaufman et al. (2009)
legal origins	English, French, German or Scandinavian	*bri*, *fre*, *ger* and *sca*	La Porta et al., 1999
Regime durability	The number of years since the most recent regime change (defined by a three point change in the p_polity score over a period of three years or less) or the end of transition period defined by the lack of stable political institutions (denoted by a standardized authority score).	*Durable*	Marshall and Jaegger's Polity's 4 database
latitude		*latitude*	La Porta et al., 1999
ethnic fragmentation	Reflects probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group. The higher the number, the more fractionalized society.	*ethnic*	Alesina et al., 2003
age dependency ratio (% of working age population)		*Depratio_wa*	WDI

Appendix B – Model derivation

We consider a typical economy with a constant elasticity of substitution utility function of the representative agent given by:

$$U = \int_0^\infty e^{-\gamma t} \frac{c_t^{1-\theta} - 1}{1-\theta} dt \qquad \text{(B1)}$$

where c is per capita consumption, θ is the intertemporal substitution and γ is the (subjective) time discount rate or rate of time preference (a higher γ implies a smaller desirability of future consumption in terms of utility compared to utility obtained by current consumption. Population (which we assume identical to labour force, L) grows at the constant rate n, that is, $L_{it} = L_{i0} e^{n_i t}$. Output in each country i at time t is determined by the following Cobb-Douglas production function:

$$Y_{it} = K_{it}^{\alpha} G_{it}^{\beta} (A_{it} L_{it})^{1-\alpha-\beta}, 0 < \alpha < 1,\ 0 < \beta < 1,\ 0 < \alpha + \beta < 1. \qquad \text{(B2)}$$

Y is the final good, used for private consumption, G is public consumption expenditure, which proxies for government size, and K is the stock of physical capital. We consider the case of no depreciation of physical capital. The output used to produce G equals qG (which one can think of as being equivalent to a crowding-out effect in private sector's resources). A is the level of technology and grows at the exogenous constant rate μ, that is, we have

$$A_{it} = A_{i0} e^{\mu_i t + I_{it} \rho_i} \qquad \text{(B3)}$$

with I_{it} being a vector of institutional quality, political regime, legal origin and other related factors that may affect the level of technology and efficiency in country i at time t, and ρ_i is a vector of (unknown) coefficients related to these variables. In this framework, the state of labour-augmenting technology (A) depends not only on exogenous technological improvements determined by μ, but also on the level of institutional quality.

We begin by writing down the resource constraint for this economy in per worker terms, given by:

$$\dot{K}_t = Y_t - C_t - qG_t \Leftrightarrow \dot{k}_t = y_t - c_t - qg_t - nk_i \qquad \text{(B4)}$$

where $\dot{K}_t$ is the time derivative of physical capital and small letters represent per worker terms (after scaling down by L).

We now write the conditions that characterize the optimal path for the economy and determine the steady-state solution for private and public consumption and income per worker. The optimal path is the solution of:

$$\max_{c_t, g_t} \int_0^\infty e^{-\gamma t} \frac{c_t^{1-\theta} - 1}{1-\theta} dt \qquad \text{(B5)}$$
$$s.t.: \dot{k}_t = k_t^{\alpha} g_t^{\beta} A_t^{1-\alpha-\beta} - c_t - qg_t - nk_i$$

To obtain the First Order Condition, the Hamiltonian can be written as:

$$H = \frac{c_t^{1-\theta} - 1}{1-\theta} + \lambda \left[k_t^{\alpha} g_t^{\beta} A_t^{1-\alpha-\beta} - c_t - qg_t - nk_t \right] \qquad \text{(B6)}$$

F.O.C.:

$$\frac{\partial H}{\partial c_t} = 0 \Leftrightarrow c_t^{-\theta} = \lambda \qquad \text{(B7)}$$

$$\frac{\partial H}{\partial g_t} = 0 \Leftrightarrow [\beta k^{\alpha} g^{\beta-1} A^{1-\alpha-\beta} - q] = 0 \qquad \text{(B8)}$$

$$\dot{\lambda} = \gamma\lambda - (\alpha k^{\alpha-1} g^{\beta} A^{1-\alpha-\beta} - n)\lambda \Leftrightarrow \dot{\lambda} = (\gamma + n - \alpha k^{\alpha-1} g^{\beta} A^{1-\alpha-\beta} - n)\lambda \qquad \text{(B9)}$$

$$\lim_{t\to\infty} e^{-\gamma t}\lambda_t k_t \tag{B10}$$

Differentiating Eq. B7 with respect to time we obtain:

$$\frac{\partial \lambda}{\partial t}=\frac{\partial}{\partial t}(c^{-\theta}) \Leftrightarrow \dot{\lambda}=-\theta\dot{c}c^{-\theta-1} \tag{B11}$$

Using Eq. B11 and B7 in Eq. B9 we get:

$$\frac{\dot{c}}{c}=\frac{1}{\theta}(\alpha k^{\alpha-1}g^{\beta}A^{1-\alpha-\beta}-n-\gamma) \tag{B12}$$

By Eq. B8 we know that:

$$g=\frac{\beta^{\frac{1}{1-\beta}}k^{\frac{\alpha}{1-\beta}}A^{\frac{1-\alpha-\beta}{1-\beta}}}{q^{\frac{1}{1-\beta}}} \tag{B13}$$

Now using Eq. B13 in Eq. B12:

$$\frac{\dot{c}}{c}=\frac{1}{\theta}\left(\alpha\frac{\beta^{\frac{\beta}{1-\beta}}}{q^{\frac{\beta}{1-\beta}}}\left(\frac{A}{k}\right)^{\frac{1-\alpha-\beta}{1-\beta}}-\gamma-n\right) \tag{B14}$$

By definition in the steady-state (SS) consumption is growing at a constant rate. Therefore, in the SS the right-hand side (RHS) of Eq. B14 has to be constant, which implies that technology and capital have to grow at the same rate because all the other variables on the RHS are constant. In the SS:

$$\frac{\dot{k}}{k}=\frac{\dot{A}}{A}=\mu \tag{B15}$$

Differentiating Eq. B13 with respect to time we get:

$$\frac{\dot{g}}{g}=\frac{\alpha}{1-\beta}\frac{\dot{k}}{k}+\frac{1-\alpha-\beta}{1-\beta}\frac{\dot{A}}{A} \tag{B16}$$

We know that in the SS $\frac{\dot{k}}{k}=\frac{\dot{A}}{A}=\mu$. Therefore, $\frac{\dot{g}}{g}$ is also equal to μ, as it is a weighted average of both k and A.

Differentiating the production function (in per capita terms) with respect to time and dividing both sides by y, we obtain:

$$\frac{\dot{y}}{y}=\alpha\frac{\dot{k}}{k}+\beta\frac{\dot{g}}{g}+(1-\alpha-\beta)\frac{\dot{A}}{A} \tag{B17}$$

Therefore, in the SS the rate of growth of output is also equal to μ, as it is a weighted average of k, g and A.

Now, to find the rate of growth of consumption we divide both sides of Eq. B4 by k. That is,

$$\frac{c_t}{k_t}=\frac{y_t}{k_t}-\frac{\dot{k}}{k}-q\frac{g}{k}-n \tag{B18}$$

We know that q and n are constant, $\frac{\dot{k}}{k}$ is constant and equal to μ in the SS, y and g are growing at the same rate of k in the SS and so $\frac{y_t}{k_t}$ and $\frac{g}{k}$ are constant in the SS. Therefore, in the SS the RHS of Eq. B18 is constant. This implies that c has to grow at the same rate of k in the SS, i.e.:

$$\frac{\dot{k}}{k}=\frac{\dot{c}}{c}=\mu \tag{B19}$$

To find the per capita SS values for our variables of interest we just perform simple algebraic manipulations:

$$\frac{\dot{c}}{c} = \mu \Leftrightarrow \frac{1}{\theta}\left(\alpha \frac{\beta^{\frac{\beta}{1-\beta}}}{q^{\frac{\beta}{1-\beta}}} \left(\frac{A}{k}\right)^{\frac{1-\alpha-\beta}{1-\beta}} - \gamma - n \right) = \mu \Leftrightarrow k^* = A\left(\frac{\alpha}{\theta\mu + \gamma + n}\right)^{\frac{1-\beta}{1-\alpha-\beta}} \left(\frac{\beta}{q}\right)^{\frac{1-\beta}{1-\alpha-\beta}} \tag{B20}$$

From which we get in per capita terms:

$$g^* = A^{\frac{1-\alpha-\beta}{1-\beta}} \left(\frac{\beta}{q}\right)^{\frac{1-\beta}{1-\alpha-\beta}} k^{*\frac{\alpha}{1-\beta}}$$

$$y^* = k^{*\alpha} g^{*\beta} A^{1-\alpha-\beta} \tag{B20}$$

$$c^* = y^* - (n+\mu)k^* - qg^*$$

Table 1.a: Results of OLS Estimation. With interaction terms.

Sample	Full											
Estimator	Pooled OLS											
Spec.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**7**	**8**	**7**	**8**
Institutional Proxy		*cl*			*pr*			*polity*			*demo*	
T	0.003	0.002	0.003	0.003	0.002	0.003	-0.002	-0.003	-0.002	-0.005***	-0.005***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln k	0.942***	0.908***	0.941***	1.032***	0.999***	1.031***	1.086***	1.025***	1.080***	0.954***	0.905***	0.958***
	(0.043)	(0.042)	(0.044)	(0.044)	(0.043)	(0.045)	(0.038)	(0.039)	(0.040)	(0.041)	(0.039)	(0.041)
g	-0.064***	-0.039**	-0.037	-0.076***	-0.040**	-0.070	-0.061***	-0.027	-0.036	-0.028**	-0.004	-0.067**
	(0.013)	(0.016)	(0.050)	(0.016)	(0.017)	(0.058)	(0.017)	(0.017)	(0.026)	(0.014)	(0.015)	(0.031)
I	0.220***	0.201***	0.255***	0.112***	0.107***	0.120*	0.021***	0.024***	0.043**	0.025***	0.024***	0.016**
	(0.026)	(0.023)	(0.064)	(0.021)	(0.018)	(0.072)	(0.005)	(0.005)	(0.020)	(0.003)	(0.002)	(0.007)
I*g			-0.006			-0.001			-0.004			-0.002*
			(0.010)			(0.011)			(0.003)			(0.001)
L.America		-0.240***			-0.297***			-0.337***			-0.275***	
		(0.070)			(0.072)			(0.071)			(0.064)	
Asia		-0.773***			-0.783***			-0.842***			-0.848***	
		(0.092)			(0.100)			(0.098)			(0.085)	
Africa		-0.015			0.099			0.032			-0.011	
		(0.110)			(0.119)			(0.112)			(0.099)	
N	437	437	437	437	437	437	448	448	448	476	476	476
R2	0.923	0.934	0.923	0.909	0.924	0.909	0.897	0.915	0.897	0.917	0.931	0.918

Sample	Full											
Estimator	Pooled OLS											
Spec.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**7**	**8**	**7**	**8**
Institutional Proxy		*cpi*			*governance*			*ps*			*pc*	
T	-0.001	-0.006	-0.001	0.020	0.019	0.018	0.002	0.001	0.002	-0.001	-0.001	-0.002
	(0.008)	(0.007)	(0.008)	(0.018)	(0.017)	(0.018)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
ln k	0.813***	0.828***	0.805***	0.763***	0.771***	0.758***	1.182***	1.150***	1.183***	1.249***	1.205***	1.252***
	(0.048)	(0.042)	(0.047)	(0.058)	(0.055)	(0.056)	(0.045)	(0.049)	(0.045)	(0.039)	(0.047)	(0.039)
g	-0.007	-0.003	-0.109**	-0.039**	-0.037*	-0.080***	-0.041*	-0.009	-0.034*	-0.039	-0.017	0.034
	(0.015)	(0.015)	(0.053)	(0.018)	(0.020)	(0.027)	(0.023)	(0.023)	(0.021)	(0.025)	(0.026)	(0.064)
I	0.200***	0.201***	0.103**	0.563***	0.574***	0.240*	0.001	0.053*	0.085	0.182*	0.047	0.674
	(0.017)	(0.016)	(0.042)	(0.061)	(0.051)	(0.126)	(0.036)	(0.032)	(0.178)	(0.109)	(0.104)	(0.425)
I*g			-0.017**			-0.054***			-0.014			-0.084
			(0.007)			(0.021)			(0.031)			(0.072)
L.America		0.088			0.120			-0.317***			-0.254***	
		(0.067)			(0.092)			(0.097)			(0.096)	
Asia		-0.579***			-0.528***			-0.755***			-0.547***	
		(0.077)			(0.111)			(0.148)			(0.150)	
Africa		0.289***			0.219			0.126			0.062	
		(0.105)			(0.151)			(0.167)			(0.152)	
N	240	240	240	176	176	176	258	258	258	225	225	225
R2	0.954	0.964	0.955	0.950	0.958	0.951	0.919	0.932	0.919	0.935	0.942	0.936

Note: The models are estimated by Pooled OLS. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. A constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 1b: Results of FE Estimation. With interaction terms.

Sample	Full							
Estimator	FE							
Spec.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Institutional Proxy	*cl*		*pr*		*polity*		*demo*	
T	0.007***	0.007***	0.007***	0.007***	0.008***	0.008***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln k	0.691***	0.692***	0.687***	0.688***	0.575***	0.574***	0.609***	0.605***
	(0.078)	(0.079)	(0.077)	(0.078)	(0.079)	(0.080)	(0.079)	(0.080)
g	-0.006	-0.005	-0.005	-0.010	-0.029**	-0.038***	-0.018	-0.042**
	(0.016)	(0.024)	(0.016)	(0.019)	(0.011)	(0.012)	(0.014)	(0.017)
I	0.009	0.011	0.013	0.022	0.009***	0.004	0.002	0.005*
	(0.013)	(0.036)	(0.010)	(0.028)	(0.003)	(0.007)	(0.002)	(0.003)
I*g		0.003		0.006		-0.002*		-0.001**
		(0.006)		(0.005)		(0.001)		(0.001)
N	437	437	437	437	448	448	476	476
R2	0.823	0.824	0.825	0.826	0.836	0.839	0.821	0.826

Sample	Full							
Estimator	**FE**							
Spec.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Institutional Proxy	*cpi*		*governance*		*ps*		*pc*	
T	0.009***	0.009***	0.016***	0.016***	0.006	0.006	0.005	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
ln k	0.611***	0.611***	0.215	0.245*	0.586***	0.582***	0.588***	0.590***
	(0.152)	(0.151)	(0.152)	(0.130)	(0.141)	(0.141)	(0.157)	(0.154)
g	-0.002	-0.006	-0.015*	-0.021**	0.033	-0.058***	0.034	0.026
	(0.007)	(0.019)	(0.008)	(0.009)	(0.024)	(0.020)	(0.029)	(0.059)
I	0.004	0.012	0.128**	0.247**	-0.032	0.256*	-0.041	-0.094
	(0.013)	(0.019)	(0.061)	(0.112)	(0.041)	(0.136)	(0.040)	(0.293)
I*g		0.001		0.018		-0.043**		0.009
		(0.003)		(0.013)		(0.020)		(0.054)
N	240	240	176	176	258	258	225	225
R2	0.722	0.723	0.468	0.488	0.767	0.785	0.748	0.748

Note: The models are estimated by Fixed-Effects. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. A constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 2: Results of OLS and FE Estimation. With interaction terms. PCA-based institutional measure.

Estimator	OLS		FE	
Spec.	**1**	**2**	**3**	**4**
T	0.003	0.003	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
ln k	0.976***	0.970***	0.675***	0.676***
	(0.048)	(0.050)	(0.079)	(0.079)
g	-0.066***	-0.046*	-0.018	-0.019
	(0.015)	(0.024)	(0.014)	(0.016)
I	0.423***	0.307***	-0.016	-0.029
	(0.064)	(0.113)	(0.035)	(0.057)
I*g		0.029		0.003
		(0.026)		(0.012)
N	411	411	411	411
R2	0.913	0.913	0.821	0.821

Note: The models are estimated by Fixed-Effects. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. A constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 3: Results of Estimations controlling for endogeneity (with interaction terms of New Political Systems' measures)

Sample	All				OECD				Emerging				Developing			
Estimation	SYS-GMM															
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
l.gdppc	-1.65	-4.97***	-1.89*	-4.39***	-19.09**	-1.19	0.31	-1.80	-3.53	-5.45	-3.68	-4.81	8.53	-22.31***	-7.74***	-7.12**
	(6.041)	(1.033)	(1.132)	(1.396)	(7.542)	(1.992)	(2.091)	(1.802)	(6.262)	(7.691)	(2.859)	(3.222)	(12.310)	(4.577)	(2.636)	(2.776)
gfcf_gdp	-0.25	0.11*	0.13**	0.14**	0.67*	-0.07	-0.06	0.07	0.66**	0.02	0.29**	0.28*	-0.15	0.24***	0.13*	0.12*
	(0.192)	(0.661)	(0.058)	(0.036)	(0.363)	(0.188)	(0.155)	(0.222)	(0.262)	(0.306)	(0.137)	(0.155)	(0.203)	(0.088)	(0.075)	(0.073)
Government size proxy	govsize	Totgovexpp	Govcons	Govdeb	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt
g	-2.37**	-0.20***	-0.37***	-0.02***	-1.88**	-0.20	-0.79***	0.02	-1.51	-0.14	0.16	-0.02	-1.64	-0.14	-0.33**	-0.02***
	(1.088)	(0.049)	(0.122)	(0.005)	(0.871)	(0.158)	(0.273)	(0.062)	(1.525)	(0.139)	(0.340)	(0.034)	(1.937)	(0.087)	(0.154)	(0.004)
g*SAT	-0.70*	0.03	-0.05	-0.01	0.18	0.08	0.23	0.04	-17.61*	0.03	-0.49**	0.03	-0.14	-0.11*	0.06	0.01
	(0.393)	(0.027)	(0.056)	(0.005)	(0.206)	(0.138)	(0.380)	(0.056)	(10.570)	(0.182)	(0.211)	(0.025)	(1.677)	(0.060)	(0.101)	(0.010)
g*SDT	0.78**	0.04	-0.01	0.02***	-0.05	-0.04	0.02	0.01		-0.12	-0.03	-0.01	-0.29	0.16**	0.05	0.01***
	(0.354)	(0.045)	(0.057)	(0.003)	(0.141)	(0.124)	(0.273)	(0.054)		(0.166)	(0.148)	(0.028)	(2.086)	(0.069)	(0.115)	(0.004)
Observations	383	1757	3653	3200	116	716	938	849	117	454	868	779	170	642	1,964	1,677
Hansen (p-value)	0.04	1.00	1.00	1.00	0.89	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.38	1.00	1.00	1.00
AB AR(1) (p-value)	0.02	0.00	0.00	0.00	0.15	0.01	0.00	0.01	0.05	0.01	0.00	0.00	0.08	0.00	0.00	0.00
AB AR(2) (p-value)	0.29	0.00	0.01	0.04	0.36	0.00	0.01	0.06	0.14	0.04	0.19	0.32	0.39	0.11	0.03	0.13

Note: The models are estimated by system GMM (SYS-GMM). The dependent variable is real GDP per capita growth. "*SDT*" and "*SAT*" stand for sustained democratic transition and sustained autocratic transition –for more details refer to the main text. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. The Hansen test evaluates the validity of the instrument set, i.e., tests for over-identifying restrictions. AR(1) and AR(2) are the Arellano-Bond autocorrelation tests of first and second order (the null is no autocorrelation), respectively. Time fixed effects were included, but are not reported. Also a constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 4: Results of Estimations controlling for endogeneity (with interaction terms of legal origins' type).

Sample	All				OECD				Emerging				Developing			
Estimation	SYS-GMM															
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
l.gdppc	-0.10	-3.68**	-1.71*	-5.18***	-24.76**	-2.05	-0.21	-3.37	-4.83	-8.73*	-1.35	-5.51**	6.26	-23.22***	-7.87***	-11.61***
	(7.557)	(1.520)	(1.020)	(1.471)	(10.781)	(3.402)	(2.994)	(3.111)	(8.098)	(4.835)	(2.612)	(2.455)	(17.813)	(5.283)	(2.452)	(3.095)
gfcf_gdp	-0.19	0.12*	0.16***	0.14***	1.13***	-0.09	-0.12	0.30	0.67***	-0.06	0.14	0.22**	-0.13	0.28***	0.09	0.11
	(0.287)	(0.065)	(0.052)	(0.054)	(0.345)	(0.146)	(0.140)	(0.187)	(0.255)	(0.400)	(0.145)	(0.110)	(0.291)	(0.083)	(0.068)	(0.066)
Government size proxy	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt
g	-0.11	-0.14	-1.02***	-0.12*	-7.06*	-0.27	-0.80	-0.19	-0.05	-0.31	0.58	-0.02	15.74	-1.30**	-1.11**	-0.51*
	(0.287)	(0.299)	(0.327)	(0.061)	(3.946)	(0.775)	(0.926)	(0.154)	(2.929)	(0.396)	(0.395)	(0.020)	(14.481)	(0.602)	(0.465)	(0.282)
g*bri	-4.77	-0.04	0.61*	0.10*	5.58	-0.22	-0.54	0.33	-3.28	0.42	-1.48***	0.11	-19.14	1.28**	0.80	0.48*
	(4.481)	(0.319)	(0.371)	(0.062)	(4.154)	(0.992)	(0.936)	(0.410)	(4.053)	(0.792)	(0.560)	(0.157)	(14.805)	(0.648)	(0.543)	(0.279)
g*fre	-1.71	0.01	0.72**	0.11*	5.50	0.24	0.21	0.20	2.70	0.15	-0.72*	-0.04	-20.12	1.25**	0.66	0.51*
	(3.190)	(0.326)	(0.362)	(0.061)	(4.069)	(0.910)	(1.688)	(0.142)	(4.094)	(0.540)	(0.410)	(0.039)	(16.637)	(0.573)	(0.505)	(0.281)
g*ger	1.17	0.36	0.99	0.17*	3.88	-0.35	-0.83	0.33	-	-	-	-	-	-	-	-
	(2.167)	(0.426)	(0.836)	(0.101)	(4.741)	(0.746)	(1.701)	(0.217)								
g*sca	-0.87	-0.13	0.785	0.21**	7.01	0.24	0.29	0.39*	-	-	-	-	-	-	-	-
	(2.782)	(0.537)	(0.682)	(0.087)	(5.294)	(1.219)	(1.220)	(0.216)								
Observations	393	1886	4010	3483	116	794	1,006	910	111	462	894	798	178	677	2,201	1,858
Hansen (p-value)	0.34	1.00	1.00	1.00	0.90	1.00	1.00	1.00	0.93	1.00	1.00	1.00	0.37	1.00	1.00	1.00
AB AR(1) (p-value)	0.02	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.11	0.00	0.00	0.00
AB AR(2) (p-value)	0.15	0.00	0.00	0.01	0.76	0.00	0.02	0.04	0.31	0.02	0.29	0.30	0.15	0.03	0.00	0.05

Note: See note in Table 3 for details. "*bri*", "*fre*", "*ger*" and "*sca*" denote British, French, German and Scandinavian legal origins, respectively.

Table 5a: Results of Estimations of budgetary fiscal rules and controlling for endogeneity. Different Government size proxies (EU sample, 1990-2008)

Sample.	**EU**											
Estimation	**SYS-GMM**											
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
L.gdppc	-7.23	-9.70	-9.54	-7.47***	-6.04**	-4.98*	-5.10	-4.69	-3.16	-0.46	0.55	1.24
	(6.074)	(5.991)	(7.179)	(2.745)	(2.609)	(2.872)	(4.195)	(4.319)	(4.743)	(4.420)	(4.663)	(3.951)
gfcf_gdp	0.34	0.43***	0.42**	0.07	0.14	0.07	0.54*	0.61*	0.58*	0.26*	0.27*	0.24*
	(0.217)	(0.151)	(0.179)	(0.195)	(0.222)	(0.208)	(0.329)	(0.312)	(0.347)	(0.134)	(0.156)	(0.142)
Government size proxy	govsize	govsize	govsize	Totgovexpp	Totgovexpp	Totgovexpp	Govcons	Govcons	Govcons	Govdebt	Govdebt	Govdebt
g	0.02	-0.57	-0.18	-0.08	-0.10	-0.10	0.73	0.73	0.73	0.06	0.09	0.06
	(0.528)	(0.611)	(0.555)	(0.128)	(0.105)	(0.120)	(0.507)	(0.510)	(0.484)	(0.059)	(0.075)	(0.063)
fisrulov	0.22			1.57**			1.77*			0.79		
	(1.017)			(0.760)			(1.068)			(0.736)		
exprulov		0.46			1.97*			2.70**			1.26	
		(0.828)			(1.176)			(1.346)			(1.013)	
bbdrulov			0.46			1.08			1.45			0.31
			(0.893)			(1.023)			(1.420)			(0.895)
Observations	87	87	87	259	259	259	306	306	306	285	285	285
Hansen (p-value)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AB AR(1) (p-value)	0.25	0.21	0.31	0.14	0.12	0.15	0.32	0.28	0.31	0.04	0.03	0.04
AB AR(2) (p-value)	0.24	0.14	0.16	0.19	0.28	0.19	0.31	0.36	0.30	0.14	0.17	0.13

Note: The models are estimated by system GMM (SYS-GMM). The dependent variable is real GDP per capita growth. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. The Hansen test evaluates the validity of the instrument set, i.e., tests for over-identifying restrictions. AR(1) and AR(2) are the Arellano-Bond autocorrelation tests of first and second order (the null is no autocorrelation), respectively. Time fixed effects were included, but are not reported. Also a constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 5b: Results of Estimations of budgetary fiscal rules and controlling for endogeneity. Different Government size proxies (EU sample, 1990-2008)

Sample.	**EU**											
Estimation	**SYS-GMM**											
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
L.gdppc	-6.55	-7.70	-7.77	-4.61	-4.36	-4.42	-4.34	-7.59	-5.98	0.69	0.53	4.08
	(6.397)	(5.902)	(7.019)	(2.882)	(3.290)	(4.068)	(6.052)	(6.288)	(5.166)	(4.014)	(2.788)	(3.356)
gfcf_gdp	0.30*	0.47**	0.40*	0.32	0.24	0.24	0.62**	0.75**	0.65*	0.22*	0.32**	0.21
	(0.168)	(0.204)	(0.209)	(0.212)	(0.204)	(0.249)	(0.289)	(0.295)	(0.351)	(0.120)	(0.139)	(0.185)
Government size proxy	govsize	govsize	govsize	Totgovexpp	Totgovexpp	Totgovexpp	Govcons	Govcons	Govcons	Govdebt	Govdebt	Govdebt
g	0.56	-0.00	0.06	-0.13	-0.14	-0.13	0.66	0.63	0.72	0.06	0.06	0.09
	(0.923)	(0.715)	(0.519)	(0.083)	(0.108)	(0.095)	(0.604)	(0.572)	(0.507)	(0.053)	(0.059)	(0.063)
rule	fiscal	exp	bb	fiscal	exp	bb	fiscal	exp	bb	fiscal	exp	bb
	2.98	2.97	0.89	-2.58	-1.59	-1.55	-2.77	-0.61	-7.13	-0.29	0.41	-0.75
	(4.259)	(2.648)	(2.341)	(3.358)	(2.960)	(2.875)	(6.880)	(6.039)	(8.193)	(2.240)	(1.582)	(1.733)
interaction	-0.50	-0.45	-0.14	0.08	0.06	0.06	0.19	0.14	0.45	0.01	0.00	0.01
	(0.703)	(0.449)	(0.441)	(0.067)	(0.070)	(0.065)	(0.336)	(0.280)	(0.443)	(0.028)	(0.019)	(0.025)
Observations	87	87	87	259	259	259	306	306	306	285	285	285
Hansen (p-value)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AB AR(1) (p-value)	0.23	0.20	0.26	0.15	0.13	0.15	0.31	0.32	0.36	0.04	0.04	0.04
AB AR(2) (p-value)	0.20	0.09	0.20	0.27	0.29	0.18	0.27	0.34	0.20	0.12	0.21	0.08

Note: The models are estimated by system GMM (SYS-GMM). The dependent variable is real GDP per capita growth. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. The Hansen test evaluates the validity of the instrument set, i.e., tests for over-identifying restrictions. AR(1) and AR(2) are the Arellano-Bond autocorrelation tests of first and second order (the null is no autocorrelation), respectively. Time fixed effects were included, but are not reported. Also a constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table 6a: Results of Estimations allowing for heterogeneous technology parameters but homogeneous factor loadings (without interaction terms).

Panel A								
Sample	**OECD**							
Estimator	**PMG**				**MG**			
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Institutional variable	*cl*	*pr*	*polity*	*demo*	*cl*	*pr*	*polity*	*demo*
T	0.00	0.00	0.00	0.01***	0.01***	0.01***	0.01***	0.01***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln k	0.73***	0.55***	0.71***	0.54***	0.68***	0.68***	0.39***	0.47***
	(0.090)	(0.082)	(0.085)	(0.104)	(0.101)	(0.097)	(0.068)	(0.105)
G	-0.01	-0.01	-0.01	-0.00	-0.02*	-0.02**	-0.01*	-0.02
	(0.010)	(0.009)	(0.011)	(0.012)	(0.012)	(0.010)	(0.009)	(0.012)
I	0.01	0.00	0.00	0.001**	0.01	0.00	0.00	0.00
	(0.005)	(0.006)	(0.002)	(0.001)	(0.013)	(0.007)	(0.002)	(0.002)
Error Correction	-0.75***	-0.46***	-0.79***	-0.65***	-0.57	-0.62	-0.88	-0.79
	(0.192)	(0.156)	(0.000)	(0.000)	(0.852)	(0.904)	(0.909)	(0.837)
Hausman test for homogeneity (p-value)	*0.05*	*0.03*	*0.01*	*0.03*				
Panel B								
Sample	**Emerging**							
Estimator	**PMG**				**MG**			
Institutional variable	*cl*	*pr*	*polity*	*demo*	*cl*	*pr*	*polity*	*demo*
T	-.003	-.00	.01**	-.00	.01	.02***	.02*	.03**
	(.006)	(.005)	(.004)	(.009)	(.011)	(.005)	(.008)	(.015)
ln k	.88***	.94***	.76***	1.33***	-.12	.28*	-.09	-.69
	(.173)	(.163)	(.200)	(.340)	(.642)	(.155)	(.391)	(.544)
G	-.01	-.00	-.01	-.01	-.02	-.02	.01	.01
	(.020)	(.014)	(.011)	(.020)	(.028)	(.024)	(.031)	(.029)
I	.01	.02*	-.01	.01*	.02	-.02	.01	.00
	(.007)	(0.120)	(.007)	(.004)	(.040)	(.021)	(.019)	(.008)
Error Correction	-0.69***	-.72***	-.75***	.83***	-0.90***	-0.51	-0.71***	-.92***
	(.000)	(.001)	(.000)	(.002)	(.172)	(1.43)	(0.181)	(.177)
Hausman test for homogeneity (p-value)	0.31	0.02	0.31	0.26				
Panel C								
Sample	**Developing**							
Estimator	**PMG**				**MG**			
Institutional variable	*cl*	*pr*	*polity*	*demo*	*cl*	*pr*	*polity*	*demo*
T	.002	.002	-.00	.004**	.00	.00	.01*	-.00
	(.002)	(.001)	(.003)	(.002)	(.005)	(.003)	(.003)	(.003)
ln k	.33***	.11	.63***	.45***	.81***	.79***	.52***	.68***
	(.091)	(.110)	(.109)	(.113)	(.255)	(.234)	(.193)	(.230)
g	.01	.01	.003	.001	-.02	-.02	-.01	-.02*
	(.007)	(.004)	(.009)	(.009)	(.021)	(.018)	(.011)	(.012)
I	-.01	-.01	.01	-.001	.03**	-.02	.00	.003
	(.008)	(.012)	(.012)	(.002)	(.016)	(.016)	(.020)	(.003)
Error Correction	-.54***	-.18***	-.72***	-.60***	-.76***	-.71***	-.25	-.93***
	(.001)	(.001)	(.000)	(.000)	(.085)	(.088)	(.249)	(.128)
Hausman test for homogeneity (p-value)	0.11	0.85	0.15	0.18				

Note: The models are estimated by either PMG or MG estimators. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. Hausman test for homogeneity: under the null hypothesis the difference in the estimated coefficients between the MG and PMG estimators, it is not significant and PMG is more efficient. *, **, *** denote significance at 10, 5 and 1% levels.

Table 6b: Results of Estimations allowing for heterogeneous technology parameters but homogeneous factor loadings (with interaction terms).

Panel A						
Sample	**OECD**					
Estimator	**PMG**			**MG**		
Spec.	*1*	*2*	*3*	*4*	*5*	*6*
Institutional variable	*fh*	*polity*	*demo*	*fh*	*polity*	*demo*
T	-0.00	0.00	.01*	0.00	0.01***	.01***
	(0.002)	(0.002)	(.002)	(0.004)	(0.002)	(.002)
ln k	0.73***	0.44***	.52***	0.89***	0.41***	.44***
	(0.097)	(0.099)	(.094)	(0.127)	(0.074)	(.103)
g	0.05	0.00	.02	-0.11	-0.05	.01
	(0.068)	(0.005)	(.158)	(0.136)	(0.057)	(.114)
I	0.06	0.01	.00	-0.15	-0.03	.00
	(0.06)	(0.008)	(.018)	(0.123)	(0.034)	(.014)
I*g	-0.01	-0.001*	.00	0.01	0.00	-.00
	(0.01)	(0.001)	(.003)	(0.024)	(0.005)	(.002)
Error Correction	-0.67***	-0.40***	-.64***	-0.53	-0.94	-.75***
	(0.102)	(0.000)	(.000)	(0.848)	(0.908)	(.085)
Hausman test for homogeneity (p-value)	*0.03*	*0.04*	0.02			
Panel B						
Sample	**Emerging**					
Estimator	**PMG**			**MG**		
Spec.	*1*	*2*	*3*	*4*	*5*	*6*
Institutional variable	*fh*	*Polity*	*demo*	*fh*	*polity*	*demo*
T	.002	.01	-.01	.01**	.02*	.02**
	(.005)	(.005)	(.012)	(.006)	(.009)	(.011)
ln k	.78***	.46***	1.14**	.44**	-.14	-.41
	(.166)	(.173)	(.468)	(.178)	(.400)	(.389)
g	.09	.07	-.09	.10	.01	-.15
	(.109)	(.100)	(.145)	(.121)	(.113)	(.186)
I	.03	.05	-.02	.03	.01	-.02
	(.129)	(.056)	(.023)	(.140)	(.056)	(.022)
I*g	-.01	-.01	.01	-.01	.00	.01
	(.030)	(.012)	(.005)	(.034)	(.015)	(.007)
Error Correction	-.68***	-.67***	-.75***	-.60***	-.45*	-0.20
	(.000)	(.000)	(.000)	(.182)	(.23)	
Hausman test for homogeneity (p-value)	*0.65*	*0.34*	0.06			
Panel C						
Sample	**Developing**					
Estimator	**PMG**			**MG**		
Spec.	*1*	*2*	*3*	*4*	*5*	*6*
Institutional variable	*fh*	*polity*	*demo*	*fh*	*polity*	*demo*
T	.004	-.00	.00	.00	.00	-.00
	(.003)	(.005)	(.004)	(.004)	(.003)	(.007)
ln k	.33**	.26	-.26	.34*	.38*	.88*
	(.163)	(.200)	(.386)	(.204)	(.216)	(.514)
g	-.34	-.16*	-.07	.14	-1.34	-.06
	(.297)	(.091)	(.060)	(.229)	(1.193)	(.101)
I	-.20	.12*	-.02	.09	1.31	-.07
	(.202)	(.063)	(.016)	(.159)	(1.433)	(.050)
I*g	.04	-.02*	.00	-.02	-.18	.01
	(.052)	(.013)	(.003)	(.039)	(.202)	(.010)
Error Correction	-.60***	- .19***	-.11***	-.46***	-.51***	-.16
	(.001)	(.000)	(.000)	(.471)	(.129)	(.520)
Hausman test for homogeneity (p-value)	*0.09*	*0.03*	0.01			

Note: The models are estimated by either PMG or MG estimators. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. Hausman test for homogeneity: under the null hypothesis the difference in the estimated coefficients between the MG and PMG estimators, it is not significant and PMG is more efficient. *, **, *** denote significance at 10, 5 and 1% levels.

Table 7: Results of Estimations allowing for heterogeneous technology parameters and factor loadings. With and without interaction terms. PCA-based institutional measure.

Sample	OECD						Emerging						Developing					
Estimator	**CCEP**		**CCEMG**		**AMG**		**CCEP**		**CCEMG**		**AMG**		**CCEP**		**CCEMG**		**AMG**	
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
T			0.01***	0.04	0.01***	0.01***			0.01	0.00	0.01	0.02			0.00	0.00	0.01	0.06
			(0.004)	(0.023)	(0.002)	(0.002)			(0.012)	(0.008)	(0.010)	(0.015)			(0.011)	(0.016)	(0.005)	(0.054)
ln k	0.65***	0.65***	0.76*	0.35	0.79***	1.00***	0.57***	0.57***	0.68	-0.66	-0.16	-0.19	0.26***	0.25***	0.15	0.28	1.12***	4.15
	(0.022)	(0.024)	(0.427)	(0.420)	(0.117)	(0.154)	(0.020)	(0.020)	(0.820)	(1.634)	(0.605)	(0.381)	(0.022)	(0.022)	(0.700)	(0.244)	(0.402)	(3.744)
g	0.01	-0.01	0.03	-0.58	-0.03***	0.19	0.01	0.01	-0.05	0.00	0.02	0.10	-0.01	-0.02	-0.02	0.71	-0.02	-0.20
	(0.009)	(0.017)	(0.033)	(1.662)	(0.012)	(1.710)	(0.011)	(0.011)	(0.037)	(0.100)	(0.029)	(0.066)	(0.010)	(0.010)	(0.033)	(0.757)	(0.025)	(0.231)
I	0.03	-0.06	0.91	-1.93	2.12	-2.95	-0.00	-0.02	-0.07	-0.32	-0.06	-0.24	-0.03	0.08	-0.00	3.00	0.11**	-3.04
	(0.026)	(0.092)	(1.117)	(1.625)	(4.823)	(4.530)	(0.018)	(0.056)	(0.075)	(0.247)	(0.060)	(0.669)	(0.023)	(0.054)	(0.097)	(2.479)	(0.056)	(2.171)
I*g		0.02		0.57		-1.02		0.00		0.12		-0.00		-0.03**		-0.70		0.40
		(0.016)		(1.410)		(3.887)		(0.012)		(0.078)		(0.152)		(0.012)		(0.622)		(0.326)
RMSE			0.004	0.000	0.016	0.013			0.005	0.000	0.035	0.030			0.006	0.000	0.029	0.020
I(1)			0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00

Note: The models are estimated by CCEP, CCEMG or AMG estimators. The dependent variable is the logarithm of real GDP per capita. *T* stands for a time trend. For the CCEP estimator we include sets of cross-section period averages (see Pesaran, 2006, for details). RMSE stands for Root Mean Square Error. "I(1)" reports results for a Pesaran (2007) CIPS test with 2 lags, null of nonstationarity (full results available upon request)*, **, *** denote significance at 10, 5 and 1% levels.

Table 8: Results of Estimations allowing for homogeneous and/or heterogeneous technology parameters and factor loadings. With and without interaction terms. PCA-based institutional measure. Different Government size proxies.

Sample	OECD				Emerging				Developing			
Estimator	**OLS**	**MG**	**CCEP**	**AMG**	**OLS**	**MG**	**CCEP**	**AMG**	**OLS**	**MG**	**CCEP**	**AMG**
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
totgovexp_gdp	0.00	-0.002***	-0.01***	-0.00*	-0.03***	0.00	-0.001***	0.00	-0.00	-0.00	-0.001***	-0.00
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
I	1.02***	0.02	0.014	-0.49	0.43***	-2.60	0.01	-4.29	0.65***	-3.91	0.01	-0.00
	(0.059)	(2.491)	(0.032)	(2.903)	(0.068)	(2.598)	(0.010)	(4.293)	(0.039)	(3.894)	(0.017)	(0.019)
govcons_gdp	-0.02***	0.00	-0.02***	0.00	-0.06***	-0.00	-0.001**	-0.00	-0.02***	0.00	-0.003**	-0.00
	(0.005)	(0.002)	(0.002)	(0.002)	(0.006)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)
I	0.93***	1.56	0.04***	3.89**	0.46***	-0.01	0.00	-0.00	0.63***	-0.04	-0.00	-0.02
	(0.058)	(1.056)	(0.012)	(1.768)	(0.058)	(0.017)	(0.010)	(0.016)	(0.028)	(0.027)	(0.011)	(0.022)
govdebt_gdp	0.00	-0.00	-0.001***	-0.00	-0.001***	-0.00	0.00	-0.001**	-0.002**	-0.00	-0.001***	-0.002**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)
I	1.09***	1.17	0.04***	1.99	0.45***	0.00	-0.01	-0.01	0.62***	-2.86	0.00	-2.86
	(0.053)	(1.988)	(0.013)	(2.410)	(0.062)	(0.020)	(0.011)	(0.019)	(0.031)	(2.414)	(0.011)	(2.628)
totgovexp_gdp	-0.001*	4.42	0.01***	-0.26	-0.03***	6.94	-0.001***	-0.00	0.00	-0.02	-0.01***	-0.01*
	(0.003)	(5.179)	(0.001)	(0.747)	(0.005)	(6.946)	(0.001)	(0.002)	(0.003)	(0.020)	(0.001)	(0.006)
I	1.16***	152.49	0.01	-10.31	0.76***	243.48	0.03	0.07	0.28**	-0.40	0.12***	0.12
	(0.091)	(180.465)	(0.033)	(16.802)	(0.229)	(243.301)	(0.028)	(0.083)	(0.118)	(0.837)	(0.039)	(0.251)
I*g	-0.00*	-4.53	0.00	0.22	-0.01*	-6.96	-0.00	-0.00	-0.02***	0.01	-0.004***	-0.00
	(0.003)	(5.162)	(0.001)	(0.624)	(0.007)	(6.959)	(0.001)	(0.003)	(0.005)	(0.027)	(0.001)	(0.009)
govcons_gdp	-0.09***	-2.04	0.00	-2.66	-0.06***	0.68	-0.01***	-0.63	-0.02***	-0.17	-0.003***	-0.16
	(0.014)	(2.120)	(0.004)	(2.215)	(0.006)	(0.980)	(0.002)	(0.743)	(0.003)	(0.173)	(0.001)	(0.175)
I	0.26*	-46.66	0.11***	0.78*	0.73***	12.56	0.16***	-12.10	0.78***	-10.40	0.09***	-10.57
	(0.155)	(32.780)	(0.039)	(0.394)	(0.179)	(19.236)	(0.028)	(14.459)	(0.077)	(10.266)	(0.024)	(10.325)
I*g	-0.10***	1.74	-0.01***	2.37	-0.02*	-0.68	-0.01***	0.64	-0.01**	0.30	-0.01***	0.31
	(0.012)	(1.775)	(0.003)	(1.907)	(0.010)	(0.981)	(0.002)	(0.743)	(0.005)	(0.290)	(0.001)	(0.292)
govdebt_gdp	-0.00	-0.26	-0.001***	-0.32	-0.002***	0.89	0.00	0.41	-0.00	0.24	-0.002***	0.20
	(0.002)	(0.288)	(0.000)	(0.271)	(0.001)	(1.096)	(0.000)	(0.476)	(0.000)	(0.188)	(0.000)	(0.204)
I	0.91***	-9.52	0.05**	-9.93	0.60***	15.50	-0.02	7.53	0.72***	1.64	0.00	5.23
	(0.104)	(9.635)	(0.019)	(9.260)	(0.119)	(21.701)	(0.017)	(9.332)	(0.049)	(4.870)	(0.014)	(5.012)
I*g	-0.002*	0.24	-0.00	0.29	-0.001*	-0.90	0.00	-0.42	-0.002**	-0.24	-0.00	-0.34
	(0.002)	(0.256)	(0.000)	(0.241)	(0.002)	(1.096)	(0.000)	(0.476)	(0.001)	(0.307)	(0.000)	(0.342)

Note: The models are estimated by Pooled OLS, MG, CCEP or AMG estimators. The dependent variable is the logarithm of real GDP per capita. *, **, *** denote significance at 10, 5 and 1% levels.

Annex – additional results

Table A1: Results of Estimations with FE and GMM. With interaction terms of New political systems' measures. Different Government size proxies (first-differenced).

Sample	**All**							
Estimation	**Fixed Effects**				**SYS-GMM**			
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
L.gdppc	-4.70	-2.91***	-1.84***	-1.79***	14.37**	-7.88***	-2.69**	-4.97***
	(4.148)	(0.461)	(0.306)	(0.319)	(6.618)	(1.424)	(1.294)	(1.556)
Gfcf_gdp	-0.16**	0.14***	0.15***	0.17***	-0.44***	0.05	0.16***	0.17***
	(0.082)	(0.021)	(0.014)	(0.015)	(0.147)	(0.073)	(0.063)	(0.067)
ΔGovernment size proxy	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt
Δg	1.73	0.23*	-0.10	-0.04***	1.25***	0.13	-0.06	-0.03***
	(1.729)	(0.121)	(0.216)	(0.010)	(0.403)	(0.129)	(0.265)	(0.009)
Δg*sat	0.37	0.34***	0.25	0.01	0.22	0.23	0.23	0.02
	(2.263)	(0.127)	(0.222)	(0.013)	(1.579)	(0.144)	(0.273)	(0.016)
Δg*sdt	1.71	0.45***	0.09	-0.04***	1.55	0.27**	0.09	-0.03***
	(1.821)	(0.130)	(0.222)	(0.010)	(0.977)	(0.133)	(0.268)	(0.007)
Observations	389	1,788	3,816	3,321	289	1,666	3,642	3,113
R-squared	0.20	0.46	0.25	0.36				
Hansen (p-value)					0.02	1.00	1.00	1.00
AB AR(1) (p-value)					0.05	0.00	0.00	0.00
AB AR(2) (p-value)					0.32	0.00	0.00	0.10

Note: The models are estimated by system GMM (SYS-GMM). The dependent variable is real GDP per capita growth. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. The Hansen test evaluates the validity of the instrument set, i.e., tests for over-identifying restrictions. AR(1) and AR(2) are the Arellano-Bond autocorrelation tests of first and second order (the null is no autocorrelation), respectively. Time fixed effects were included, but are not reported. Also a constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table A2: Results of Estimations with FE and GMM. With interaction terms of legal origins' type. Different Government size proxies (first-differenced).

Sample	**All**							
Estimation	**Fixed Effects**				**SYS-GMM**			
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
L.gdppc	-10.02**	-2.87***	-1.89***	-1.67***	10.46	-4.96***	-1.60	-3.84***
	(4.061)	(0.441)	(0.287)	(0.299)	(8.954)	(1.403)	(1.189)	(1.337)
gfcf_gdp	-0.15*	0.16***	0.16***	0.16***	-0.47***	0.17**	0.19***	0.11**
	(0.084)	(0.021)	(0.013)	(0.015)	(0.148)	(0.077)	(0.053)	(0.050)
ΔGovernment size proxy	govsize	Totgovexpp	Govcons	Govdebt	govsize	Totgovexpp	Govcons	Govdebt
Δg	1.40	-0.03	-0.19*	-0.05**	1.87	-0.02	-0.19	-0.05**
	(1.448)	(0.129)	(0.099)	(0.020)	(1.221)	(0.160)	(0.188)	(0.023)
Δg*bri	-1.27	-0.20	-0.18*	-0.03	-1.23	-0.19	-0.14	-0.02
	(1.832)	(0.137)	(0.112)	(0.022)	(2.250)	(0.189)	(0.275)	(0.031)
Δg*fre	-1.44	0.01	-0.03	0.04**	-1.60	0.03	0.03	0.05*
	(1.594)	(0.135)	(0.112)	(0.020)	(1.698)	(0.178)	(0.198)	(0.024)
Δg*ger	-1.37	-0.57*	-2.94***	-0.28**	-3.52	-0.59	-2.87**	-0.34
	(2.268)	(0.329)	(0.809)	(0.130)	(2.837)	(0.457)	(1.169)	(0.221)
Δg*sca	-3.86*	-0.67***	-1.43***	-0.13*	-6.09***	-0.86**	-1.50*	-0.18
	(2.334)	(0.211)	(0.479)	(0.072)	(2.034)	(0.371)	(0.791)	(0.117)
Observations	395	1,897	4,137	3,576	295	1,784	3,993	3,388
R-squared	0.24	0.26	0.36	0.47				
Hansen (p-value)					0.10	1.00	1.00	1.00
AB AR(1) (p-value)					0.04	0.00	0.00	0.00
AB AR(2) (p-value)					0.33	0.00	0.00	0.03

Note: see Table A1.

Table A3: Results of Estimations controlling for endogeneity (with interaction terms of Freedom House).

Estimation	**Fixed Effects (within)**				**SYS-GMM**				**Fixed Effects (within)**				**SYS-GMM**			
Sample	**All**								**OECD**							
Spec.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
inigdppc	-3.17***	-3.70***	-3.09***	-2.96**	-2.33***	-2.65***	-1.29*	-1.17	-1.35**	-1.01***	-0.54*	-1.06	-2.24*	-1.14***	-0.31	-0.67
	(0.460)	(0.609)	(0.539)	(1.190)	(0.813)	(0.888)	(0.733)	(0.848)	(0.539)	(0.220)	(0.317)	(0.742)	(1.214)	(0.392)	(0.620)	(0.942)
Gfcf_gdp	0.19***	0.14***	0.18***	0.24***	0.29***	0.17**	0.25***	0.40***	0.12***	0.06	0.08	0.05	0.10	0.04	0.04	0.09
	(0.027)	(0.042)	(0.033)	(0.087)	(0.055)	(0.070)	(0.068)	(0.153)	(0.036)	(0.050)	(0.051)	(0.071)	(0.073)	(0.074)	(0.076)	(0.086)
govsize	1.03***				1.65***				0.47*				0.98**			
	(0.161)				(0.278)				(0.252)				(0.408)			
Govsize*fh	-0.02**				0.00				-0.00				0.00			
	(0.010)				(0.027)				(0.014)				(0.031)			
Totgovexp_gdp		-0.07**				-0.09**				-0.10***				-0.10***		
		(0.026)				(0.045)				(0.025)				(0.029)		
Govexp*fh		-0.00				0.00				-0.00				0.00		
		(0.003)				(0.003)				(0.001)				(0.001)		
Govcons_gdp			-0.05				0.12				-0.25***				-0.45***	
			(0.053)				(0.125)				(0.079)				(0.124)	
Govcons*fh			-0.01***				-0.02**				-0.01				-0.02	
			(0.004)				(0.010)				(0.011)				(0.017)	
Govdebt_gdp				-0.01				0.01				0.02				0.06**
				(0.020)				(0.024)				(0.014)				(0.025)
Govdebt*fh				-0.00				0.00				-0.01*				-0.01**
				(0.003)				(0.003)				(0.003)				(0.005)
Observations	860	538	1,111	335	738	415	935	234	224	192	225	154	194	162	195	124
R-squared	0.24	0.19	0.19	0.12					0.16	0.21	0.18	0.06				
					0.14	0.58	0.01	0.41					1.00	1.00	1.00	1.00
					0.00	0.00	0.00	0.34					0.00	0.00	0.00	0.01
					0.33	0.08	0.91	0.52					0.02	0.02	0.02	0.01

Note: The models are estimated by Within Fixed Effects (FE-within). The dependent variable is real GDP per capita growth, as identified in the first row. Robust heteroskedastic-consistent standard errors are reported in parenthesis below each coefficient estimate. Time fixed effects were included, but are not reported. Also a constant term has been estimated but it is not reported for reasons of parsimony. *, **, *** denote significance at 10, 5 and 1% levels.

Table A4: First Generation Panel Unit Root Tests

Im, Pesaran and Shin (2003) Panel Unit Root Test (IPS) (a)

	Real GDPpc		**Investment (gfcf_gdp)**		**Capital (k)**		**Labour**
in levels							
lags	*[t-bar]*	*lags*	*[t-bar]*	*lags*	*[t-bar]*	*lags*	*[t-bar]*
OECD							
1.10	2.37	1.10	-4.09***	1.55	3.87	0.63	4.49
Emerging							
0.82	6.24	1.32	-3.90***	1.92	-0.07	1.11	-2.71***
Developing							
1.17	4.03	1.02	-6.04***	1.58	0.29	2.39	-5.56***

Maddala and Wu (1999) Panel Unit Root Test (MW) (b)

	Real GDPpc		**Investment (gfcf_gdp)**		**Capital (k)**		**Labour**	
lags	p_λ	*(p)*	p_λ	*(p)*	p_λ	*(p)*	p_λ	*(p)*
in levels								
0	28.51	(1.00)	107.39	(0.08)	235.73	(0.00)	160.43	(0.00)
1	36.24	(1.00)	185.60	(0.00)	85.24	(0.56)	51.88	(0.99)
2	31.39	(1.00)	154.96	(1.00)	69.14	(0.93)	50.84	(0.99)
in first differences								
0	497.79	(0.00)	660.58	(0.00)	834.39	(0.00)	533.44	(0.00)
1	359.93	(0.00)	527.06	(0.00)	576.39	(0.00)	312.65	(0.00)
2	260.52	(0.00)	378.98	(0.00)	345.99	(0.00)	169.39	(0.00)

Notes: All variables are in logarithms. (a) We report the average of the country-specific "ideal" lag-augmentation (via AIC). We report the t-bar statistic, constructed as $t-bar = (1/N)\sum_i t_i$ (t_i are country ADF t-statistics). Under the null of all country series containing a nonstationary process this statistic has a non-standard distribution: the critical values (-1.73 for 5%, -1.69 for 10% significance level – distribution is approximately *t*) are reported in Table 2, Panel A of their paper. We indicate the cases where the null is rejected with **. (b) We report the MW statistic constructed as $p_\lambda = -2\sum_i \log(p_i)$ (p_i are country ADF statistic p-values) for different lag-augmentations. Under the null of all country series containing a nonstationary process this statistic is distributed $\chi^2(2N)$. We further report the p-values for each of the MW tests.

Table A5: Second Generation Panel Unit Root Tests

Pesaran (2007) Panel Unit Root Test (CIPS)

	Real GDPpc		**Investment (gfcf_gdp)**		**Capital (k)**		**Labour**	
lags	p_{λ}	*(p)*	p_{λ}	*(p)*	p_{λ}	*(p)*	p_{λ}	*(p)*
in levels								
0	4.23	(1.00)	1.87	(0.97)	8.97	(1.00)	6.18	(1.00)
1	-1.49	(0.07)	-0.57	(0.29)	2.44	(0.99)	4.67	(1.00)
2	-0.37	(0.36)	2.488	(0.99)	4.29	(1.00)	5.43	(1.00)
in first differences								
0	-11.05	(0.00)	-16.39	(0.00)	-18.81	(0.00)	-10.29	(0.00)
1	-6.77	(0.00)	-11.91	(0.00)	-11.83	(0.00)	-5.05	(0.00)
2	-1.81	(0.04)	-7.80	(0.00)	-6.46	(0.00)	0.03	(0.51)

Notes: All variables are in logarithms. Null hypothesis of non-stationarity.